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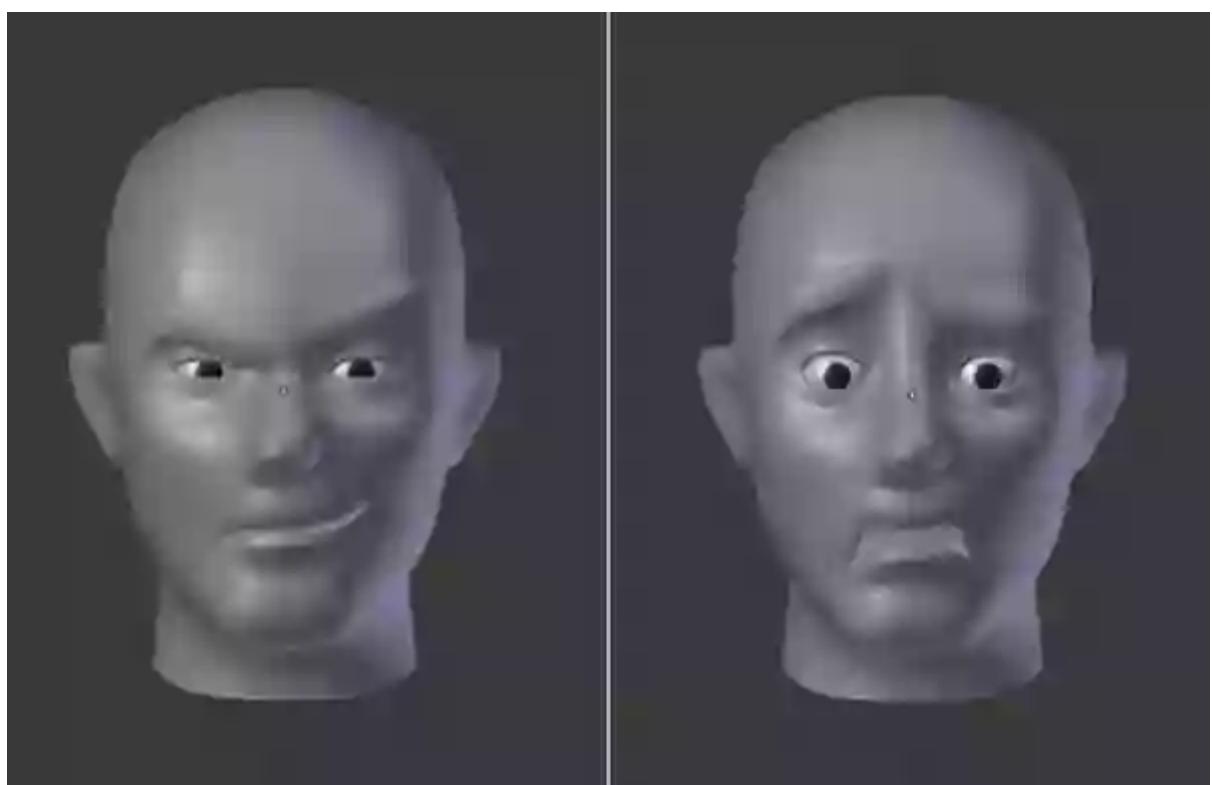
Create a Facial Animation Setup in Blender - Part 1

by Karan Shah 5 Feb 2014

Difficulty: Advanced Length: Long Languages: English ▾

Blender

3D



In this two part tutorial, you will learn how to create a basic facial animation setup for a character in Blender. The first part covers the introduction of Shape Keys and how to create basic expressions commonly used for animation. In the second part, we'll look at how to add drivers using bones and controllers.

Additional Files:

- [Download the Project Files for Part 1.](#)

Introduction

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Basic Expressions

There are six expressions for six basic emotions - anger, happy, surprise, sad, fear and disgust. To draw or illustrate these emotions, we use the eyebrows, eyelids, and mouth. Just by changing these lines we will get very different expressions. We must also understand how these parts move and their limitations. Many other emotions such as bored, shock, devious, confused, contempt, etc. can also be achieved through various permutation and combinations of the eyebrow line, lips, and eyes.



Shape Keys

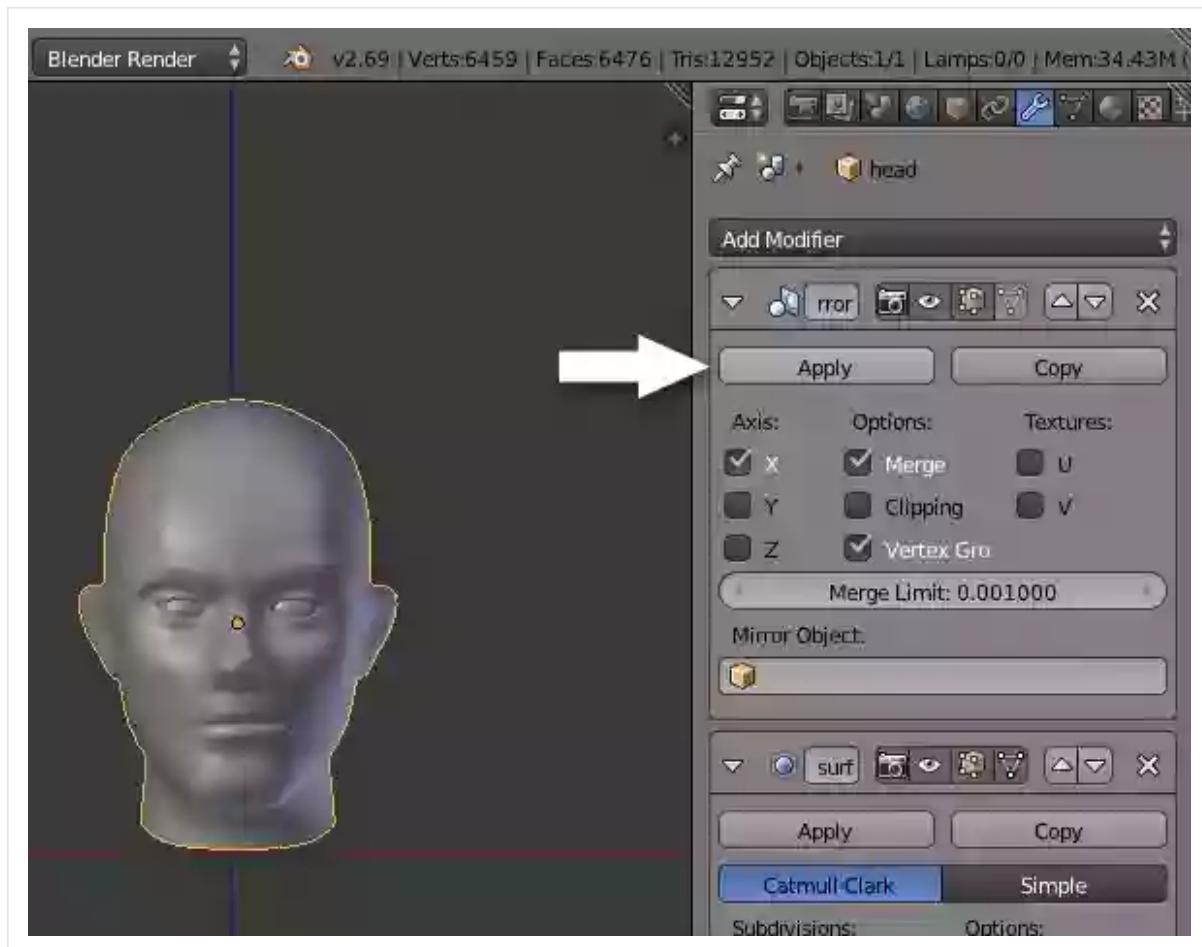
Shape keys are used where we need to animate the shape of an object by animating the vertices of the mesh, which are difficult to deform with bones. These are also known as morph targets or blend shapes.

Preparing the Mesh

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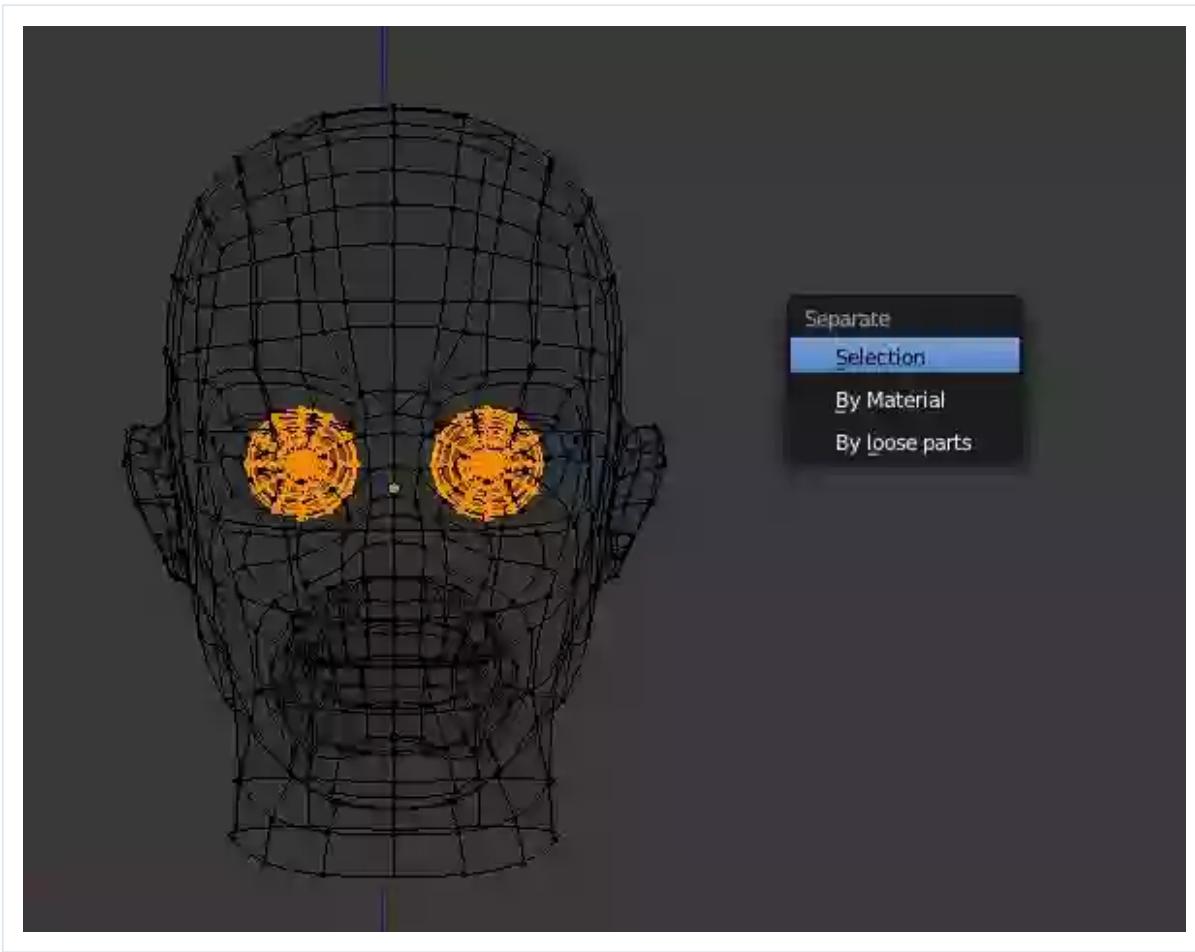
Step 1

Make sure to apply the **Mirror modifier** before creating shape keys.



While editing the mesh, we must also take care that the eyeballs

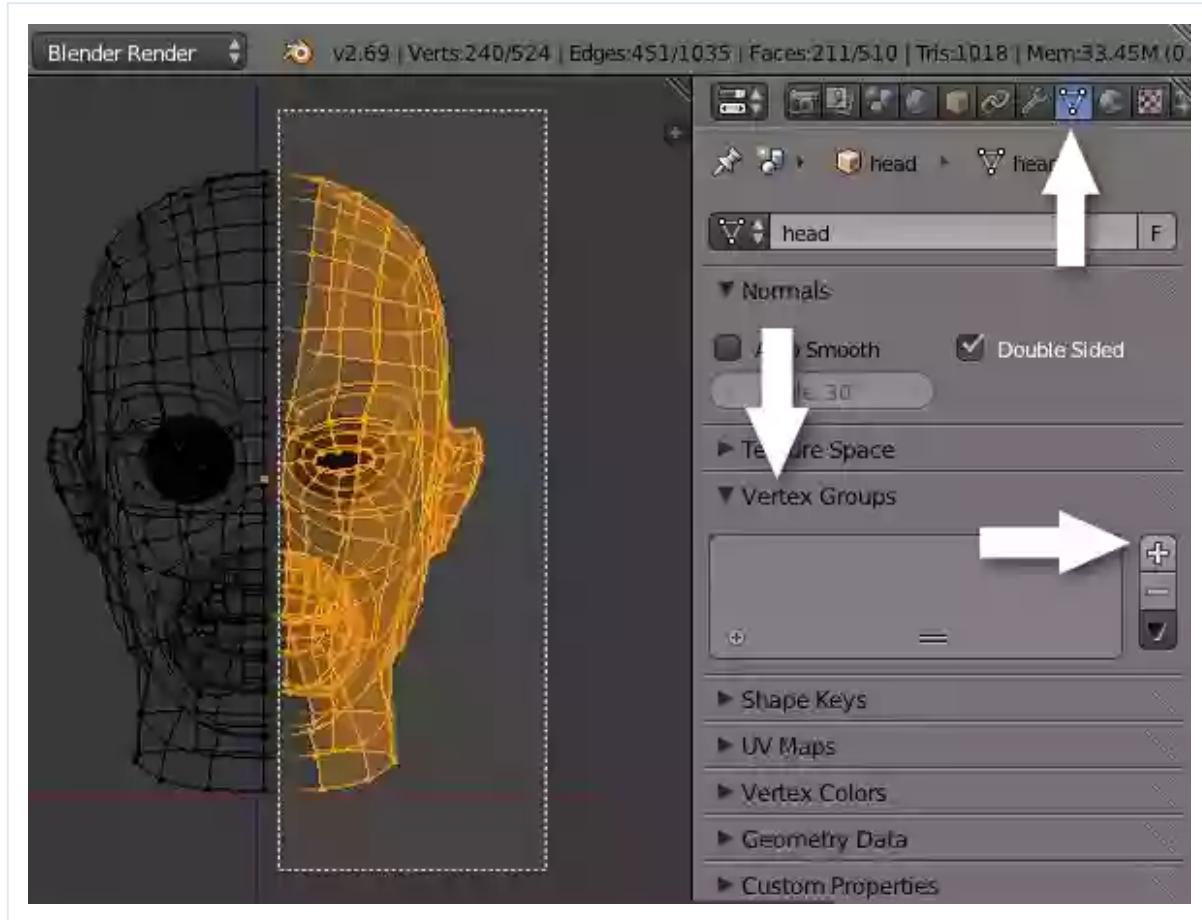
are not edited, if it's not a requirement. So it's good to make them a separate object. Select any vertex of the eye by **Right Clicking** and then press **Control-L** to select the connecting mesh (the eye sphere). Now press **P** to make them a separate object.



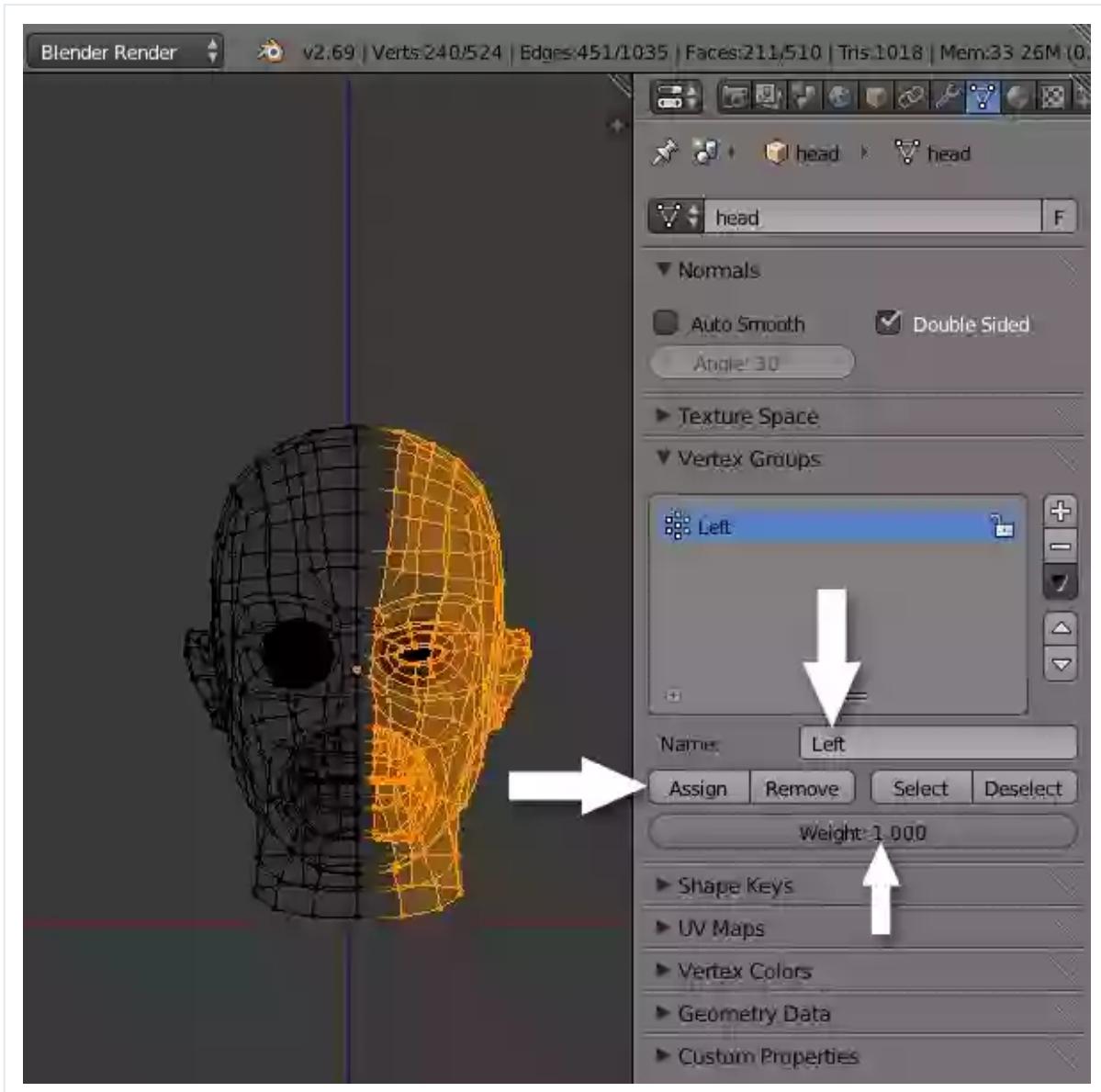
Step 2

Some shape keys apply to the whole face. But for some keys, we need to make individual shape keys for the left and right, e.g. one shape key for the raised left eyebrow and another for the raised right eyebrow. Now instead of creating one at time, we can create a shape key together and later split it into two different keys, one for the left and one for the right. This can be done by creating vertex groups and later we can assign a shape key to affect only a particular vertex group, say left or right.

In **Edit** mode, press **B** to enable drag select and select all the left side vertices. In the **Mesh Data** properties, under the **Vertex Groups** panel, press the **+** (plus) sign to add a **Group**.

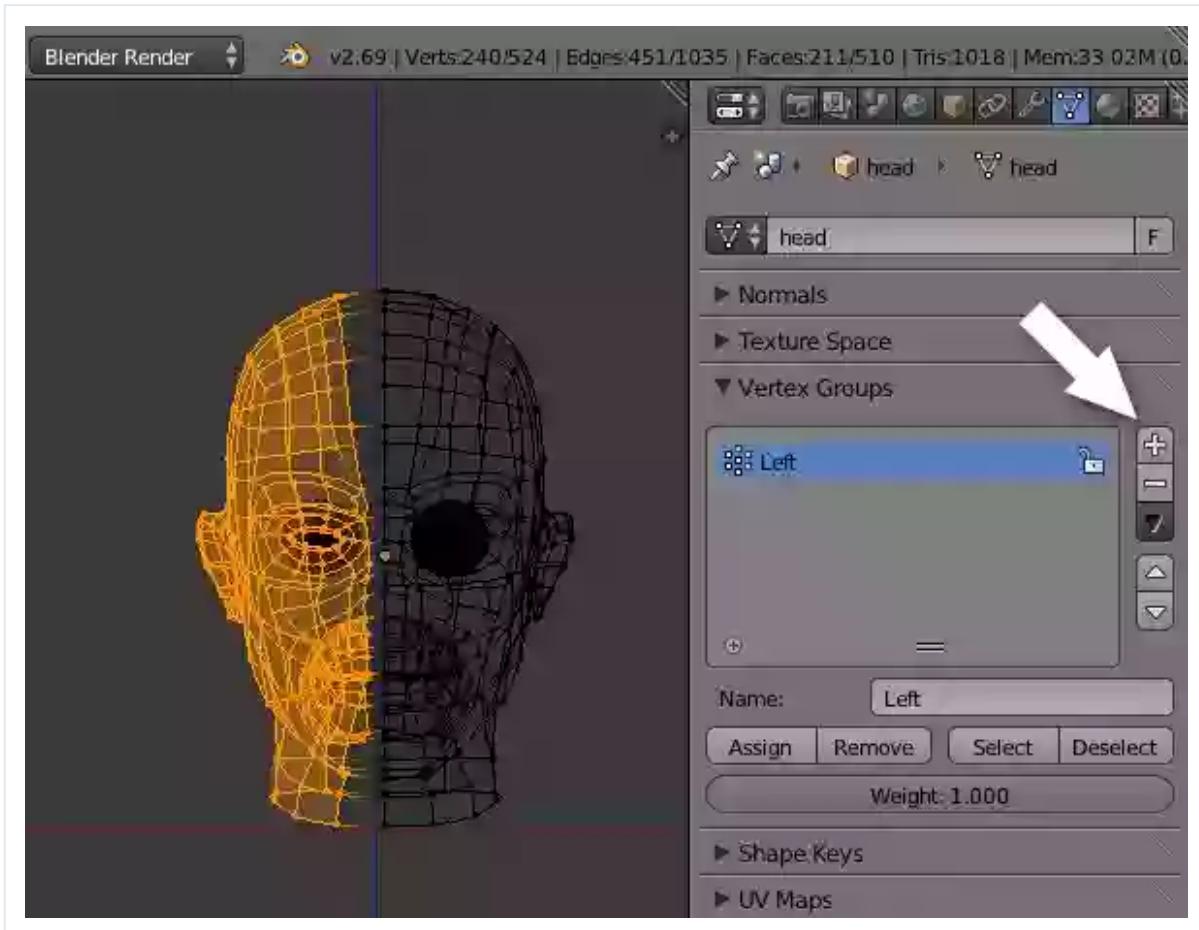


Name the vertex group **Left** and click **Assign**. Make sure the **Weight** value is set to **1.00**

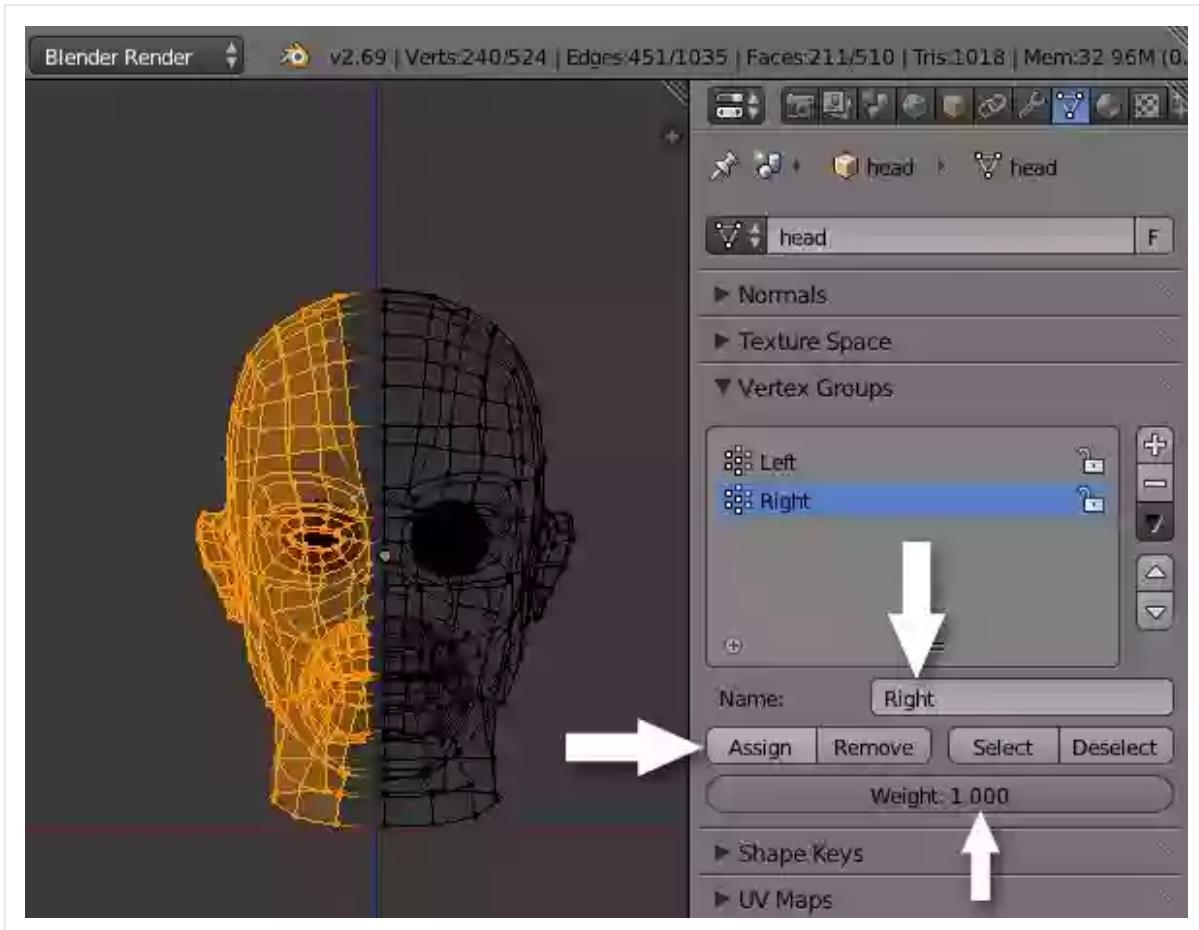


Step 3

Similarly, select all the right side vertices and create a new **Group**.

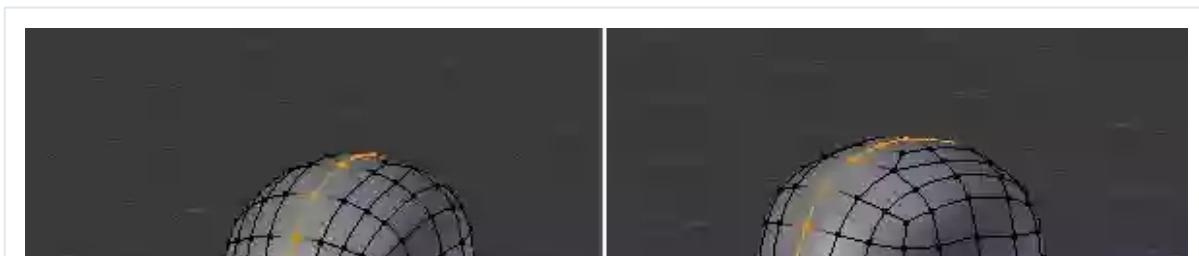


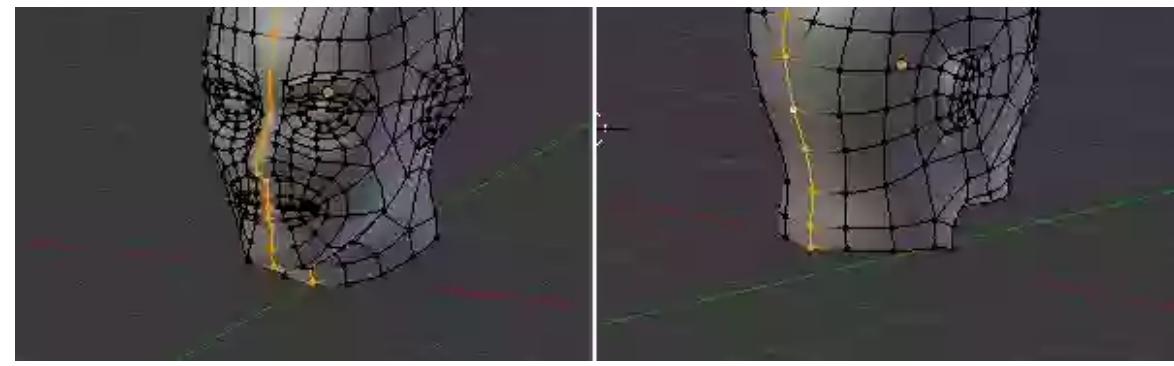
Name it **Right** and with the **Weight** set to **1.00**, press **Assign** to assign the selected vertices to the group.



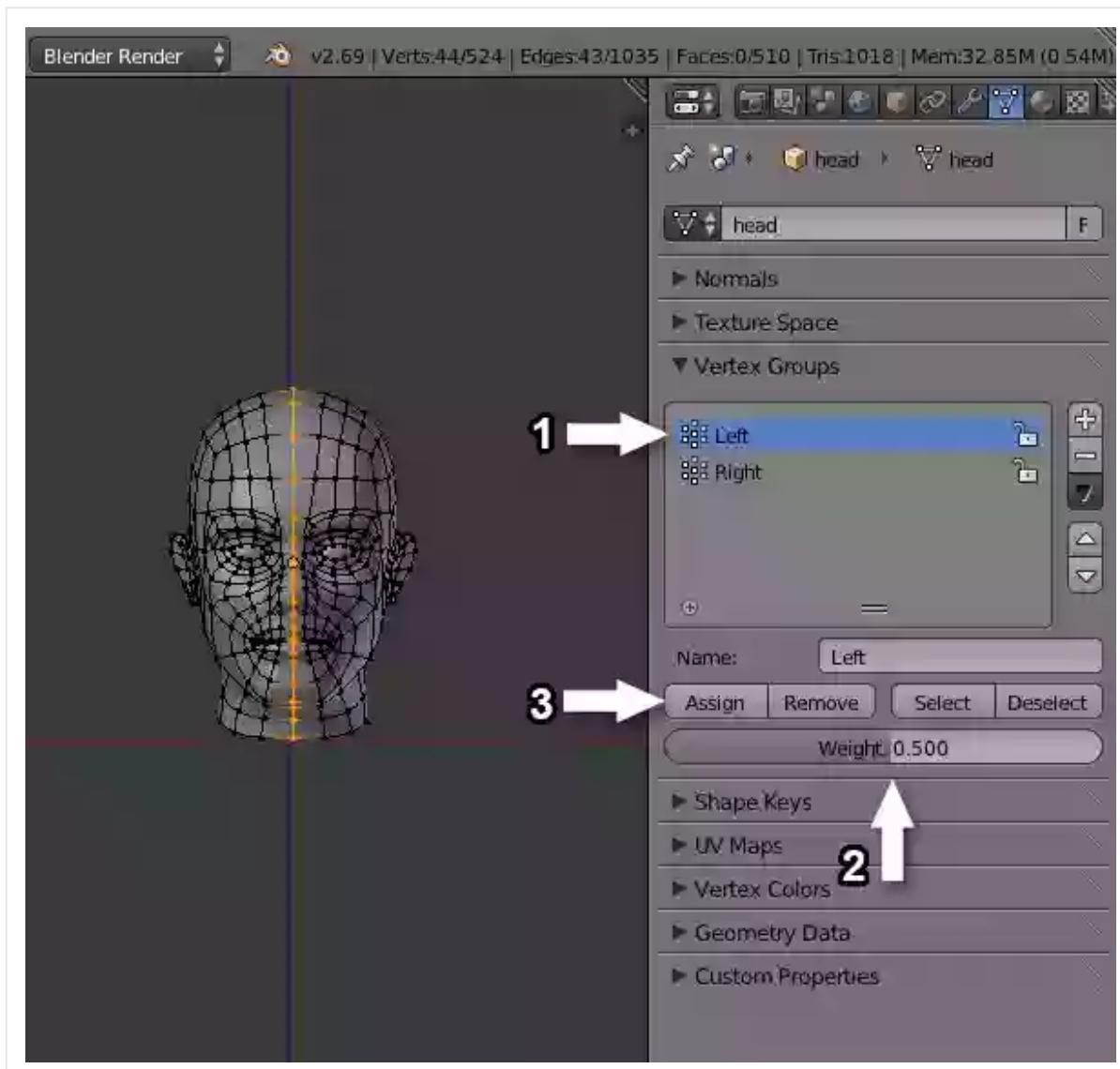
Step 4

Press **A** to deselect all vertices. Now *only* select the middle row of vertices. **Alt-Right Click** to select a row, or **Shift-Right Click** to manually select multiple vertices.



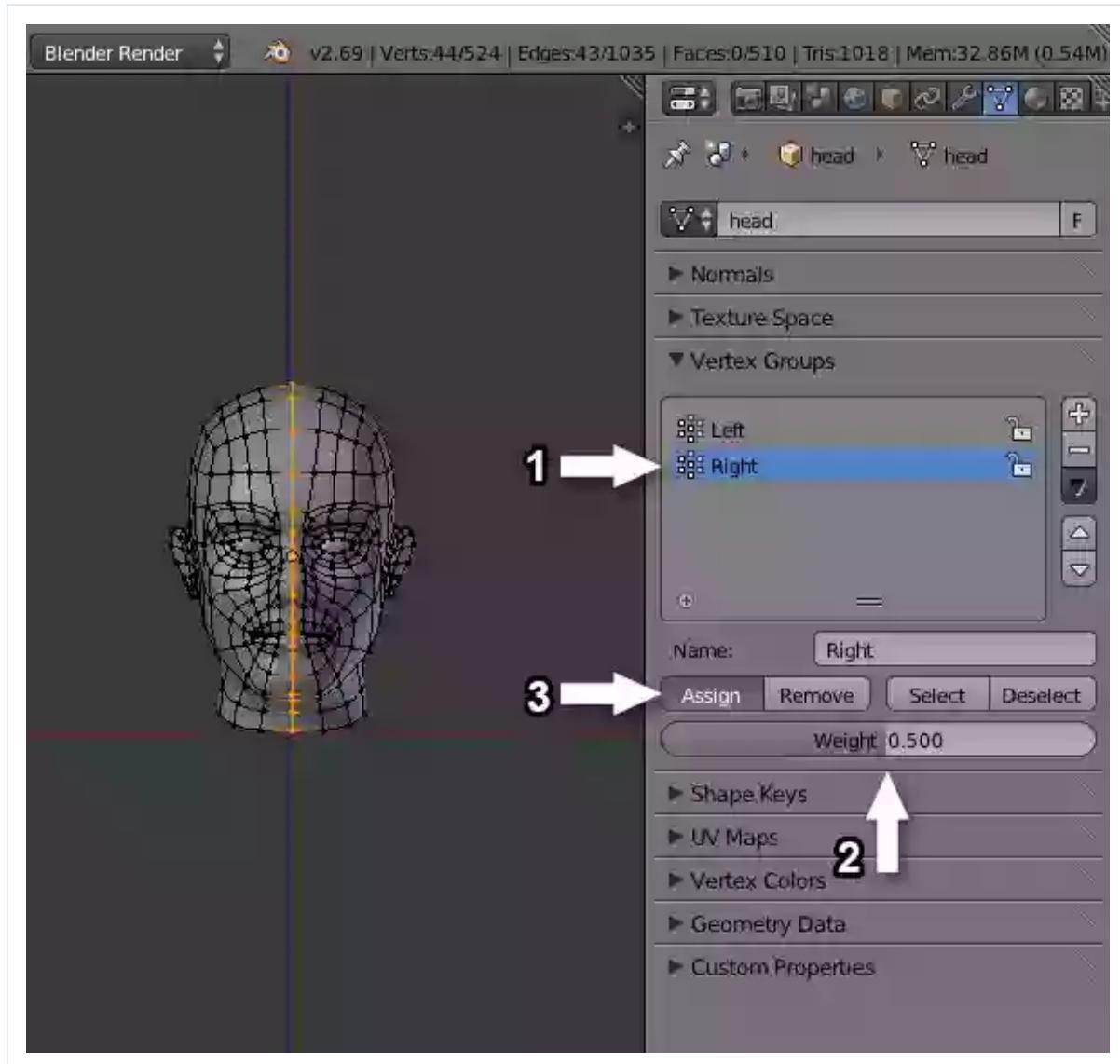


Select **Left** in the **Vertex Group** panel and reduce the **Weight** value to **0.5**, and then press **Assign**.



Similarly, assign the middle row to the **Right** vertex group with a **0.500 Weight** value. Click on **Right** in the **Vertex Group** panel, reduce the **weight** to **0.500** and then click **Assign**. By doing this,

we have assigned the middle row to both the **Left** and **Right** groups.

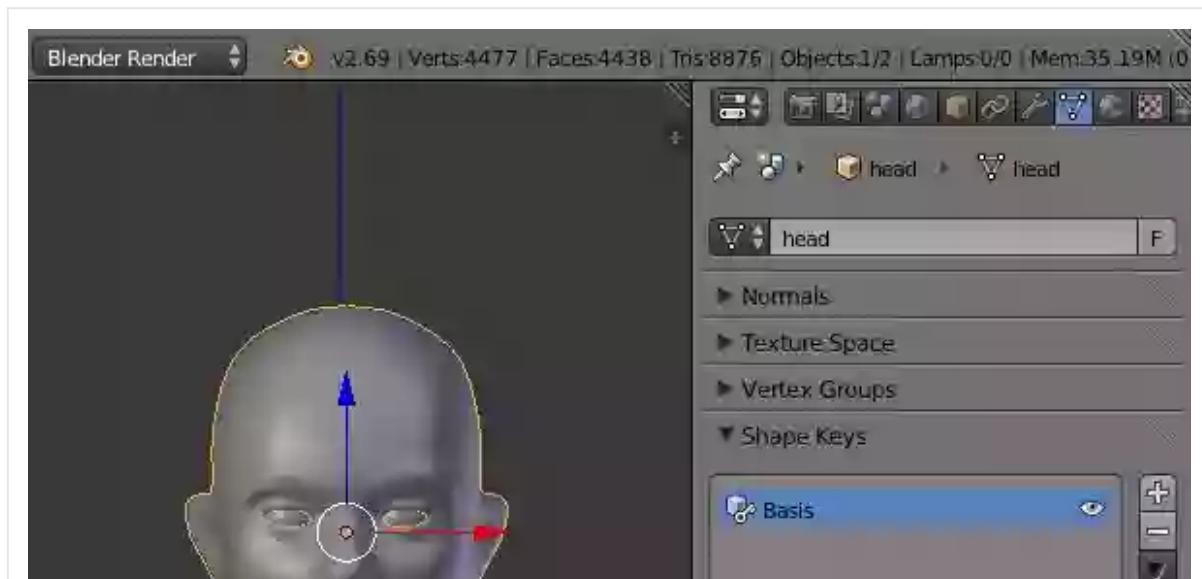
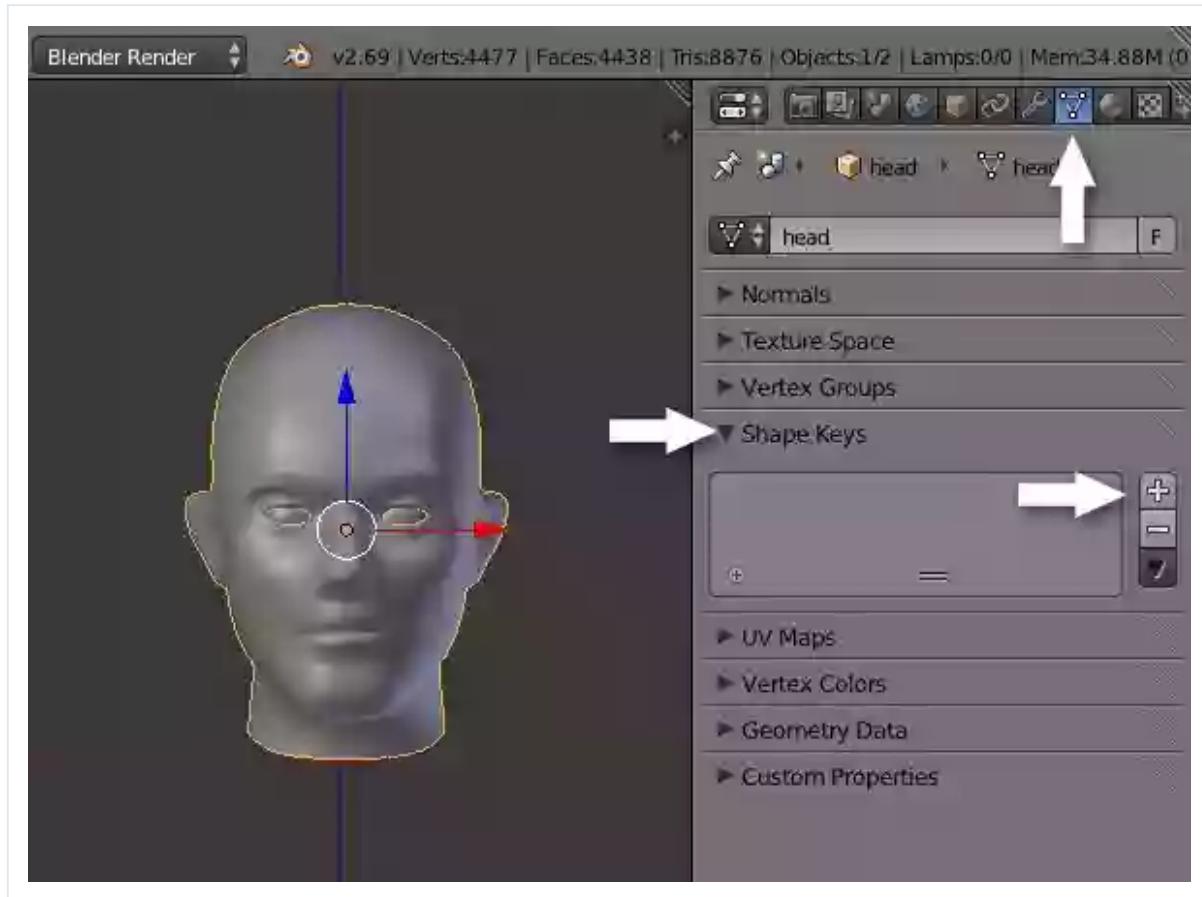


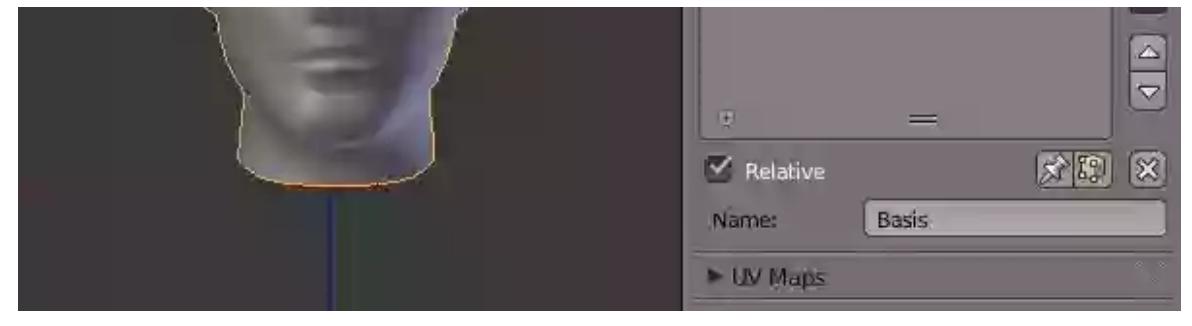
Creating Shape Keys

Step 1

Press **TAB** to exit **Edit** mode. With the **Head** object selected, Press the **+** (plus) button to add a **Shape Key**. This first shape key is

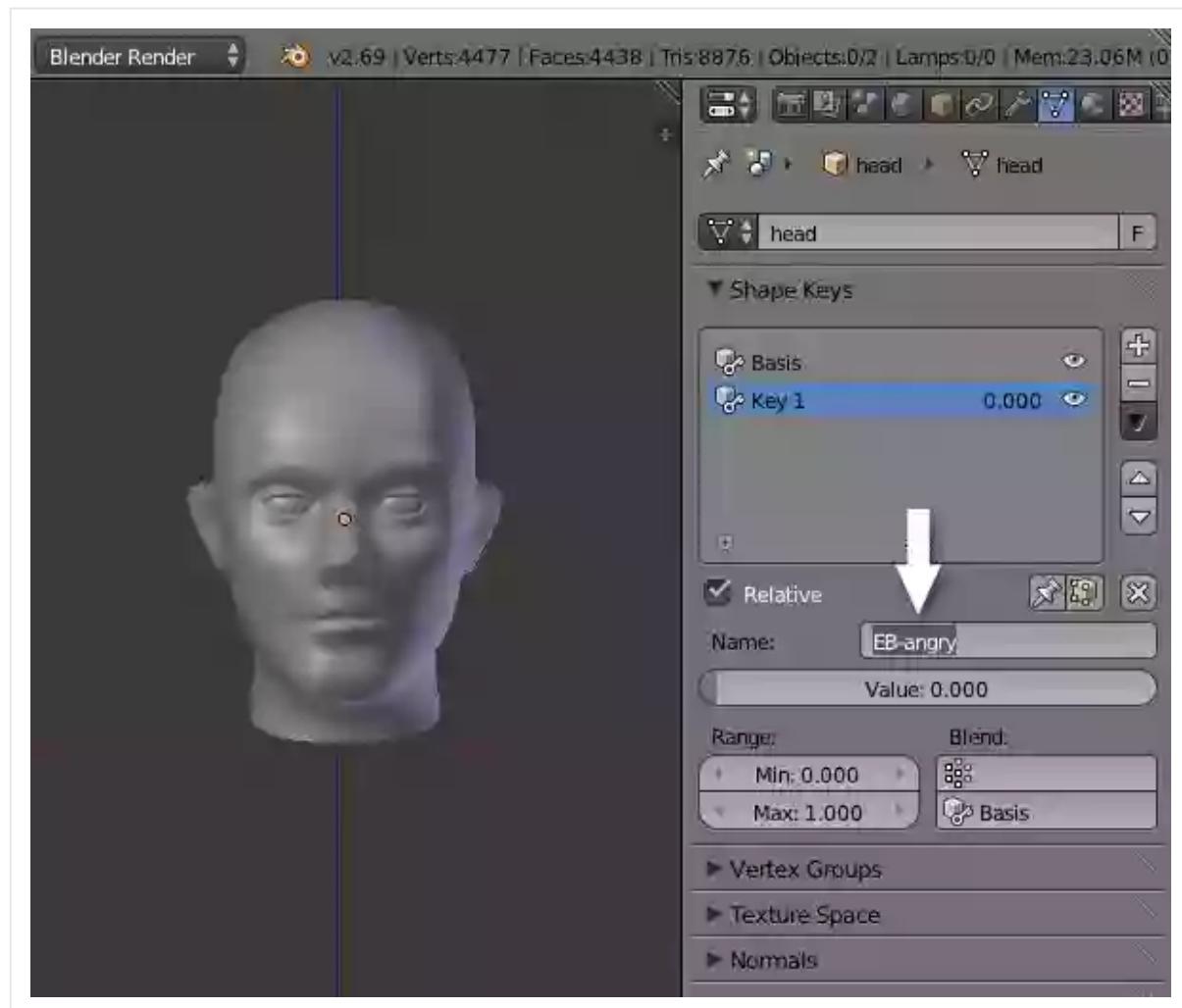
automatically named **Basis**, and is the default shape of the object. Whatever you do, try not to edit the *shape* of this key. Shape keys can only be created in **Object mode**, but we can of course edit the shape of any key by entering into **Edit mode**.





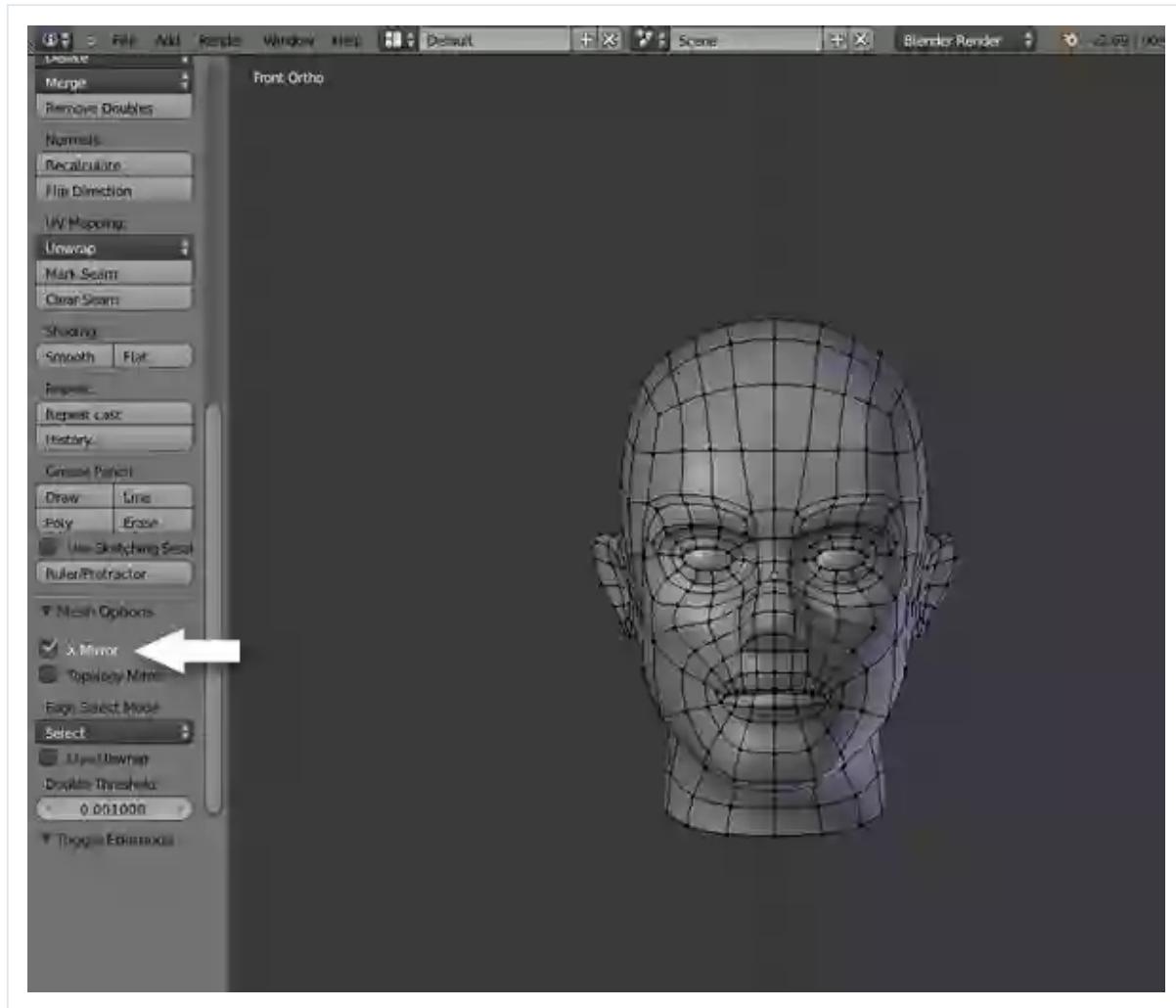
Step 2

We will create a separate shape key for each individual shape, or change to the geometry. That means one shape key for the left eyebrow raised, another for the right lip smile and so on. Add another **Shape Key** with the + (plus) button. We will start with the upper part of the face, so name this eye-brow-angry or **EB-Angry** for short (or anything else you like.)



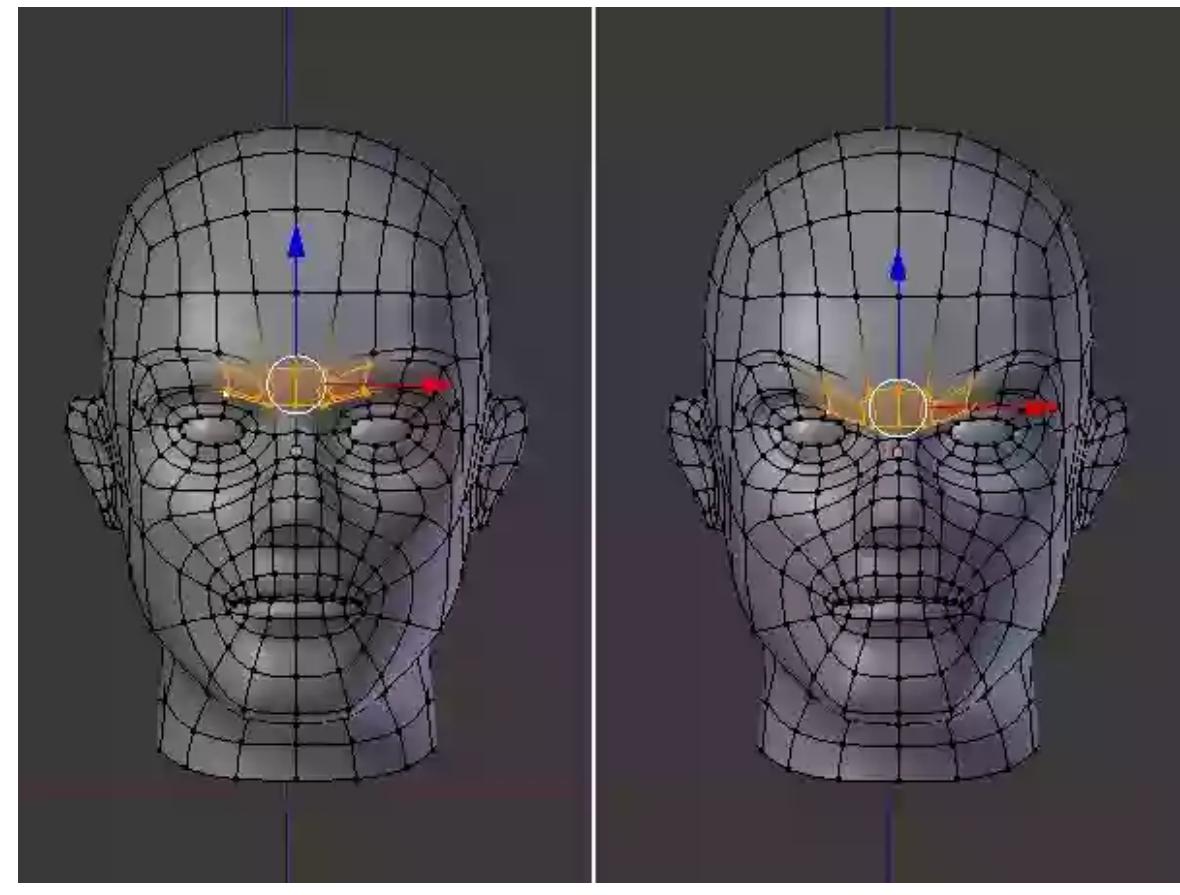
Step 3

Now we will edit this shape. Press **TAB** to enter into **Edit** mode. In the **Tools** shelf (press **T** to bring it up, if it's not there.) Check the **X-Mirror** option under **Mesh Options**. This will help us to edit the mesh using symmetry.



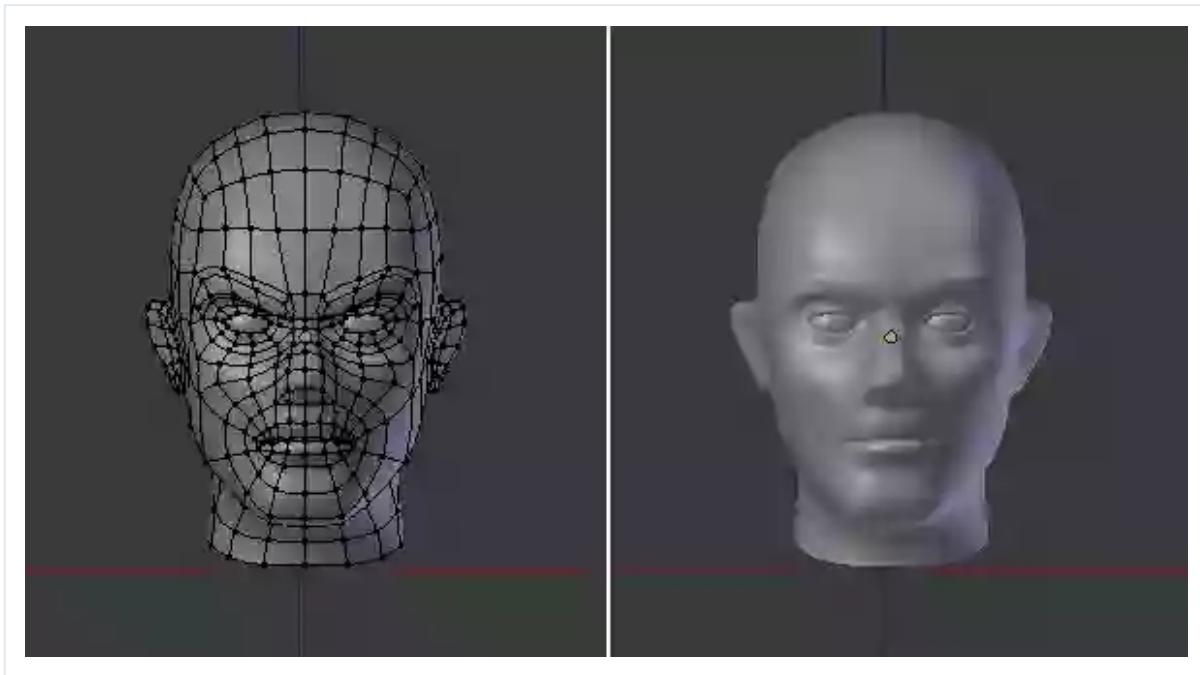
Step 4

Select the corner vertices of the eyebrow. Press **O** to enable soft selection, and use the arrow widget to pull the vertices down. Increase or decrease the effected area of the soft selection with the mouse wheel. Make sure that the eye lids are not affected too much.

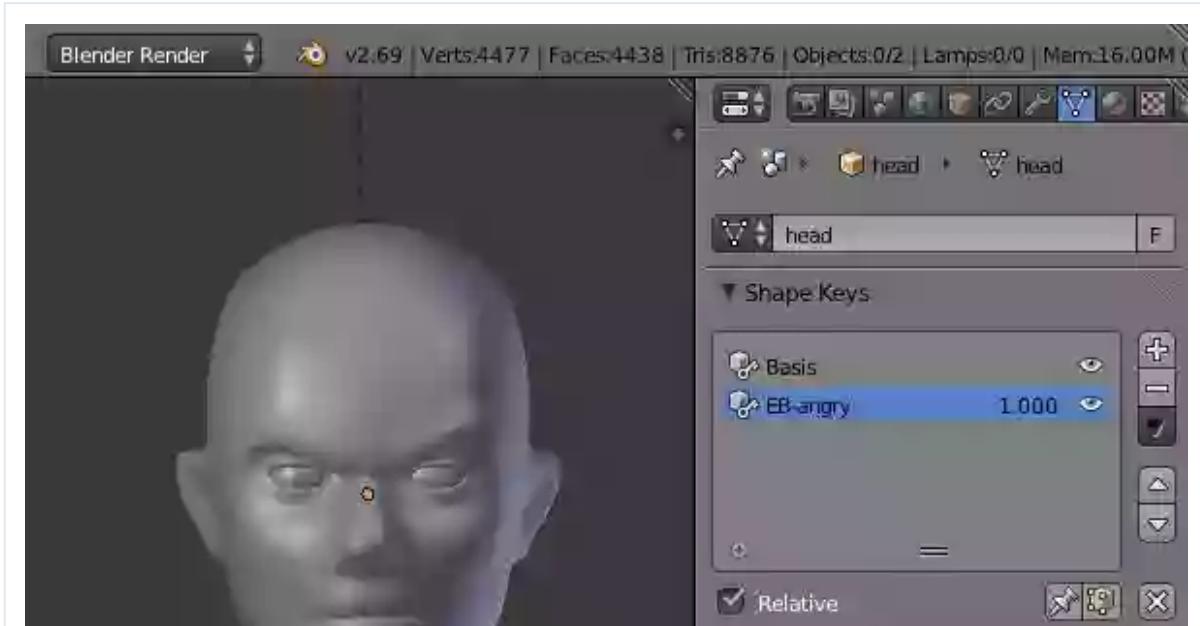


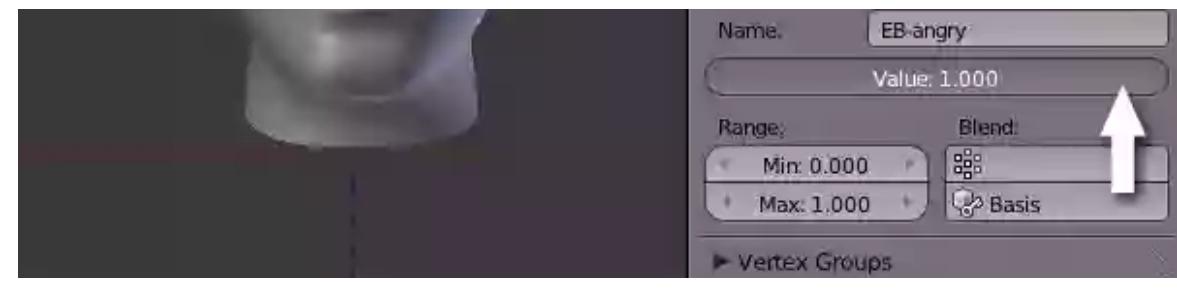
Step 5

Press **TAB** to exit **Edit** mode. You will notice that the object didn't change shape, but when you switch back into **Edit** mode, with the shape **EB-Angry** selected, the geometry changes to reflect how we edited it.



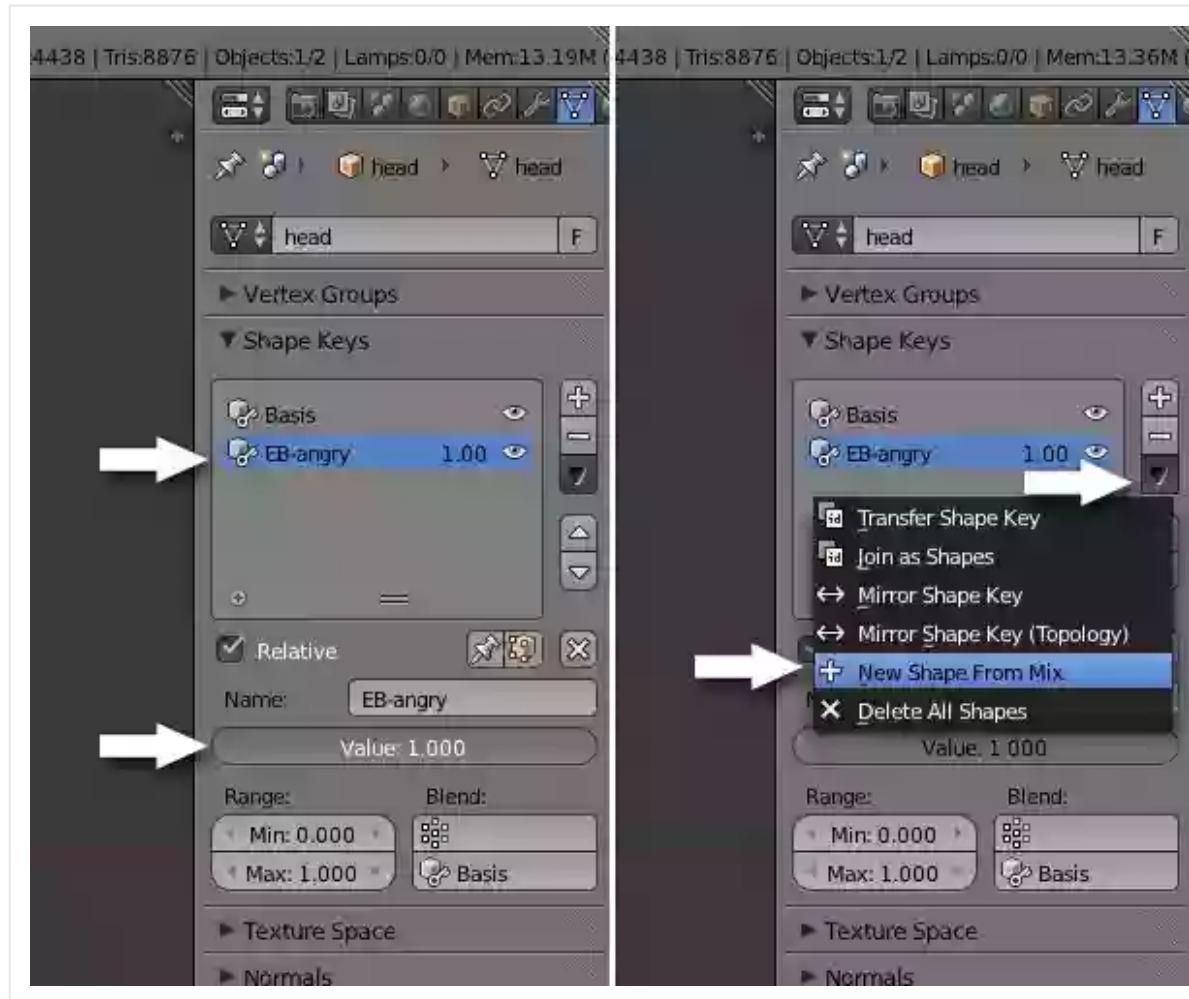
To see the affect in **Object** mode, change the **Value** slider amount up or down.





Step 6

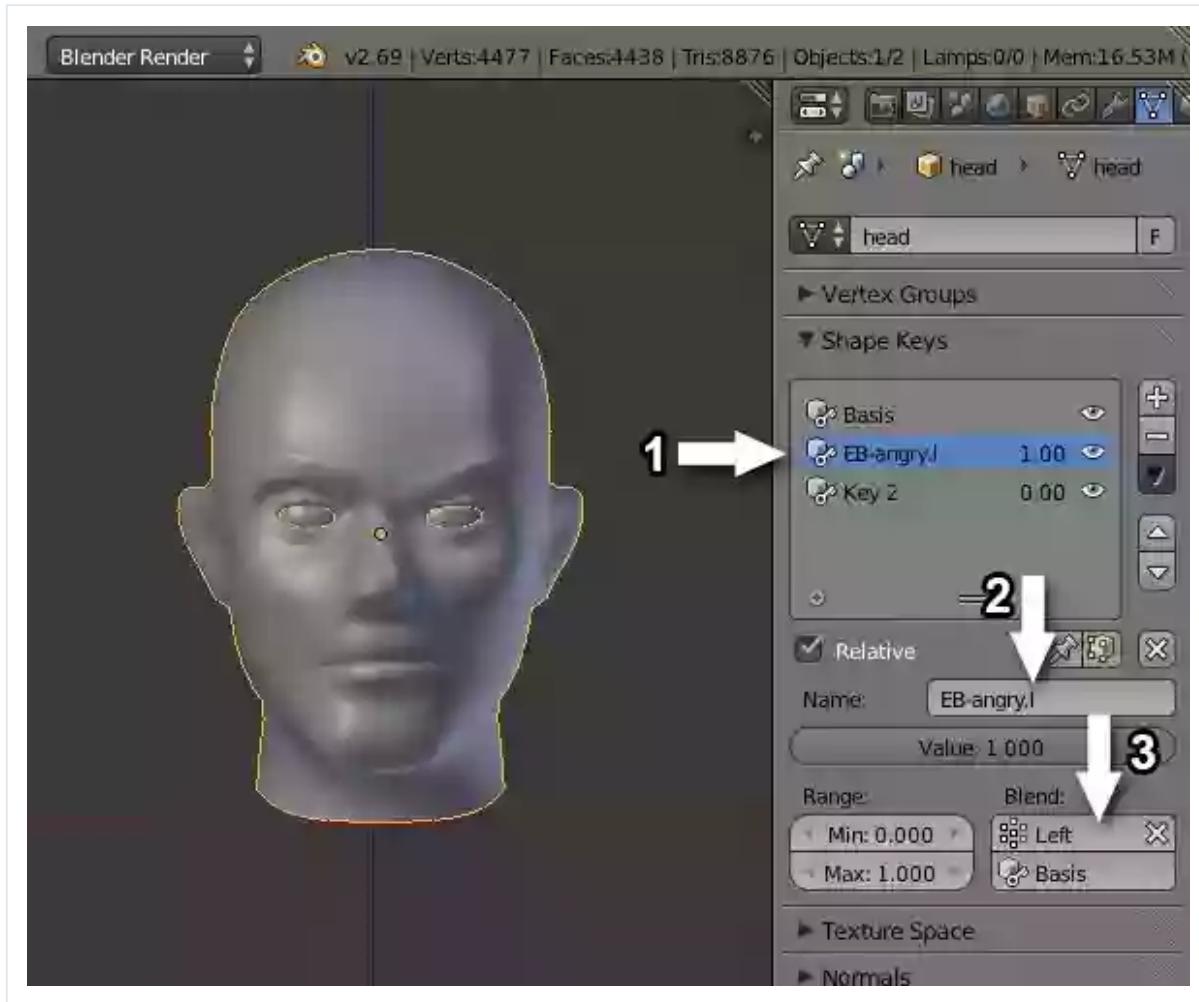
Now we will split the shape for the left and right side. With the **EB-Angry** shape selected, turn the **Value** slider all the way up to **1.00**. Click on the bottom **Arrow** button in the **Shape Keys** panel and select **New Shape From Mix**. This will create a copy of the current shape.



Step 7

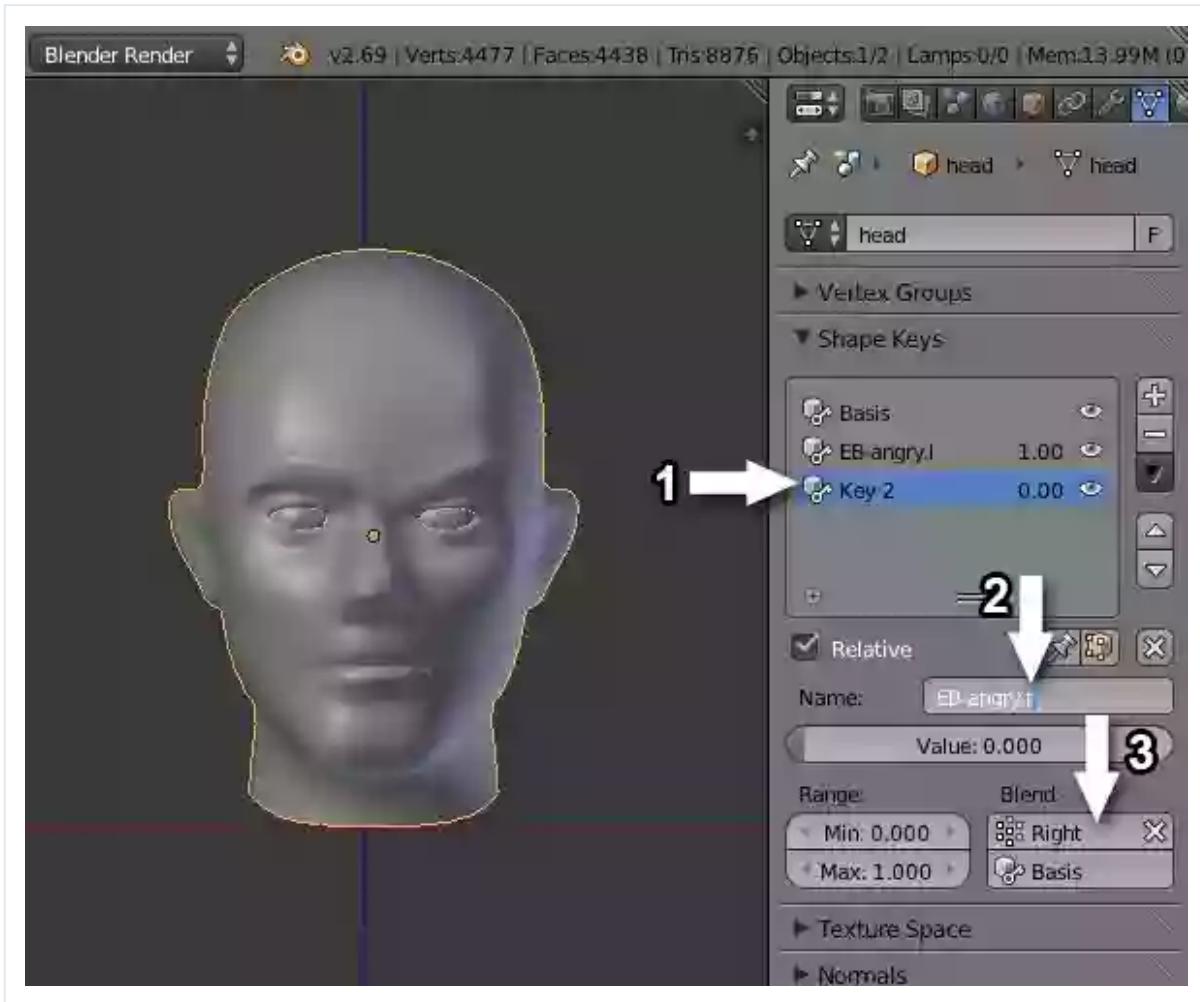
Select the **EB-angry** shape and rename it **EB-angry.L** (adding *L* for

Left). In the **Vertex** group, select **Left**. This will make the shape key deform only the *left* vertex group. Drag the **Value** slider to check.



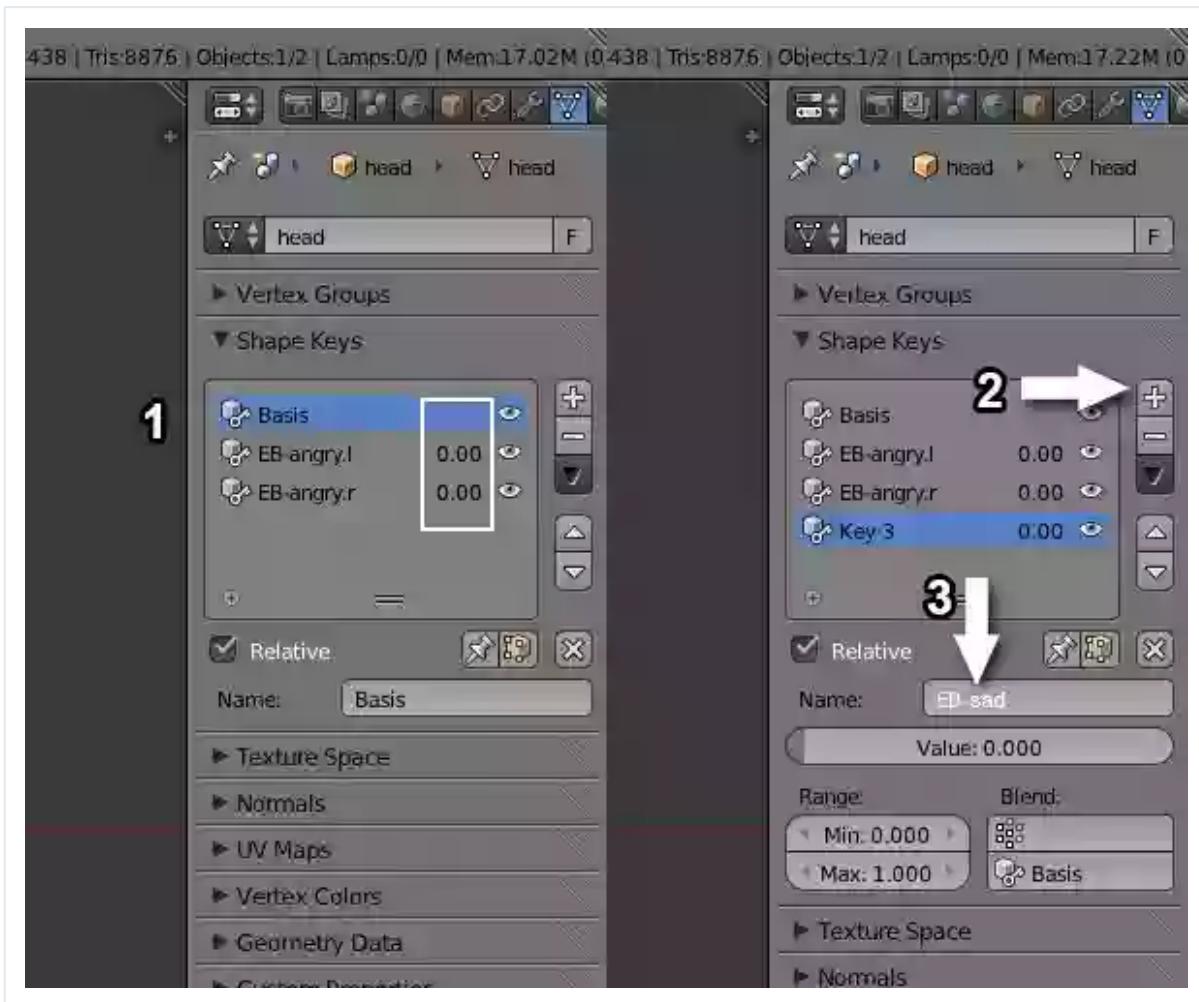
Step 8

Now select the newly created **Shape Key**. Rename it to **EB-angry.r** (*R* for right), and in the **Vertex** group select **Right**. This shape key will only deform the *right* vertex group. Drag the **Value** slider again to test it.



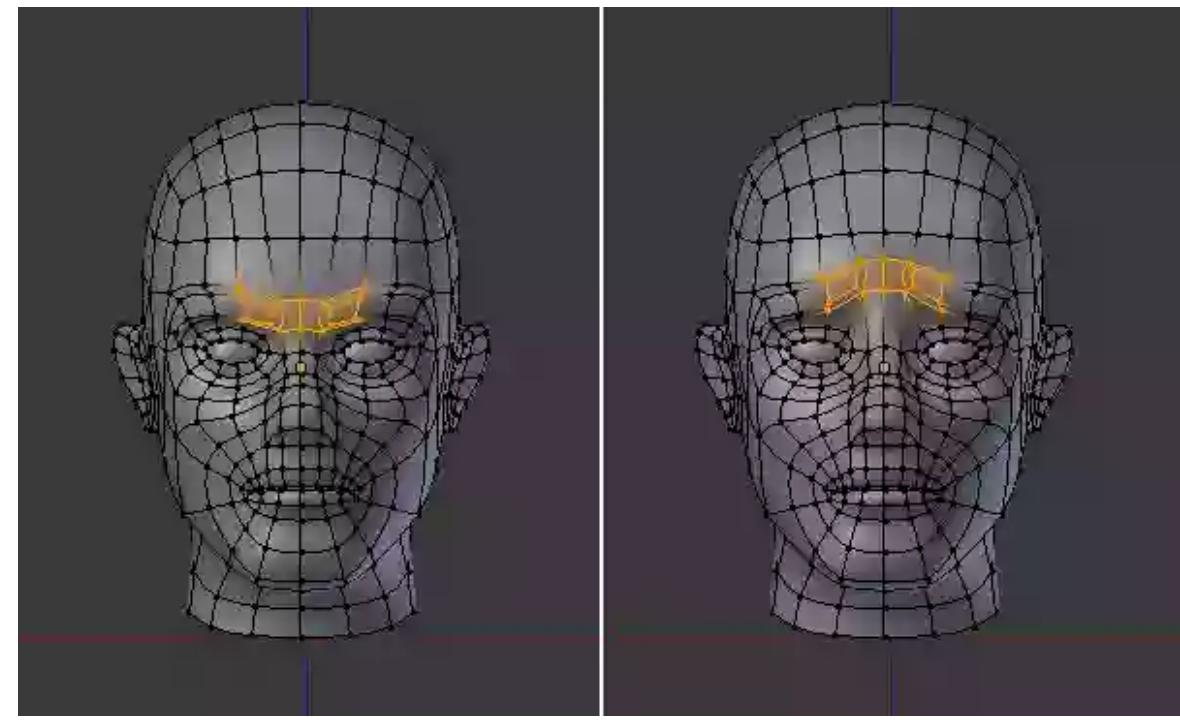
Step 9

We will now create a new shape key. Make sure *all* the keys are to **0.00**, and then click on the **+** (plus) button to add a new empty shape key with the default shape. Name it **EB-sad**.



Step 10

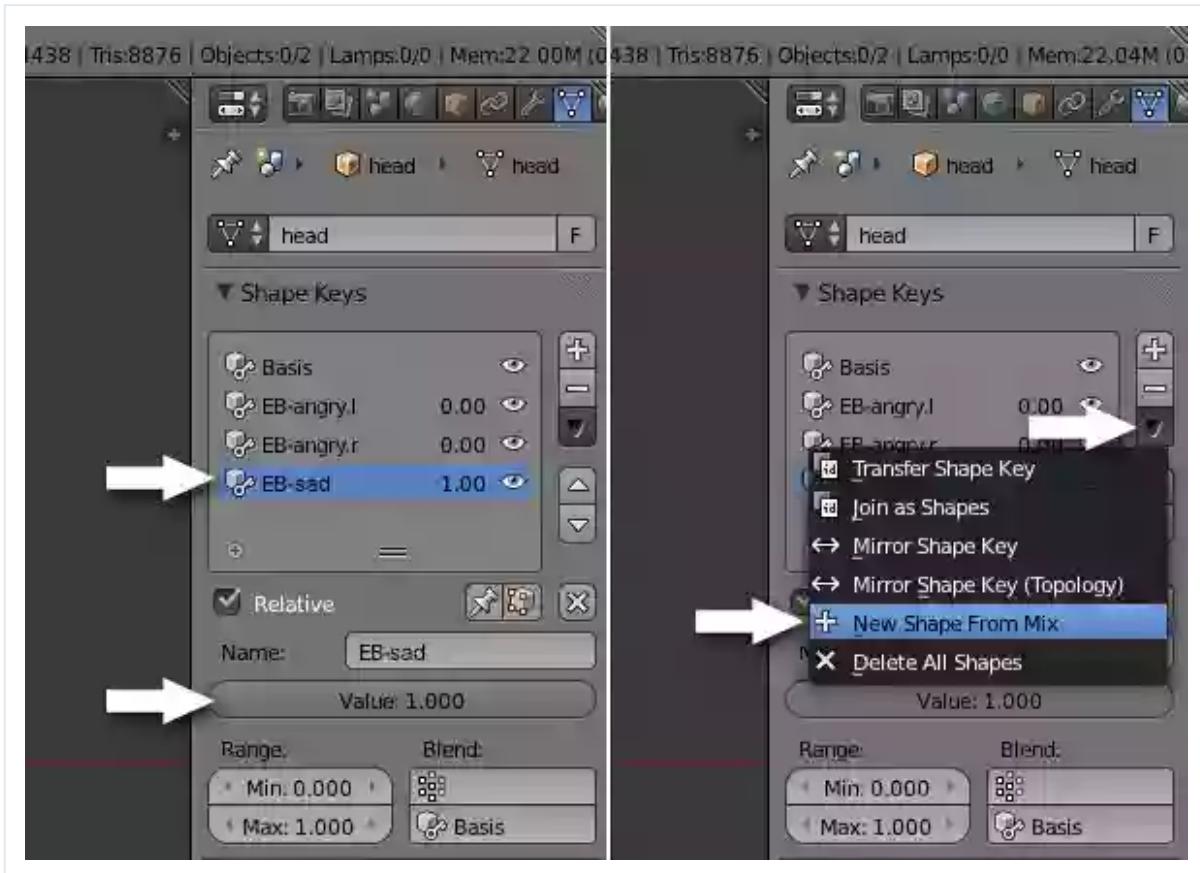
Press **TAB** to enter into **Edit** mode. Select the middle part of the eyebrows and raise them. Press **TAB** again to exit **Edit** mode.



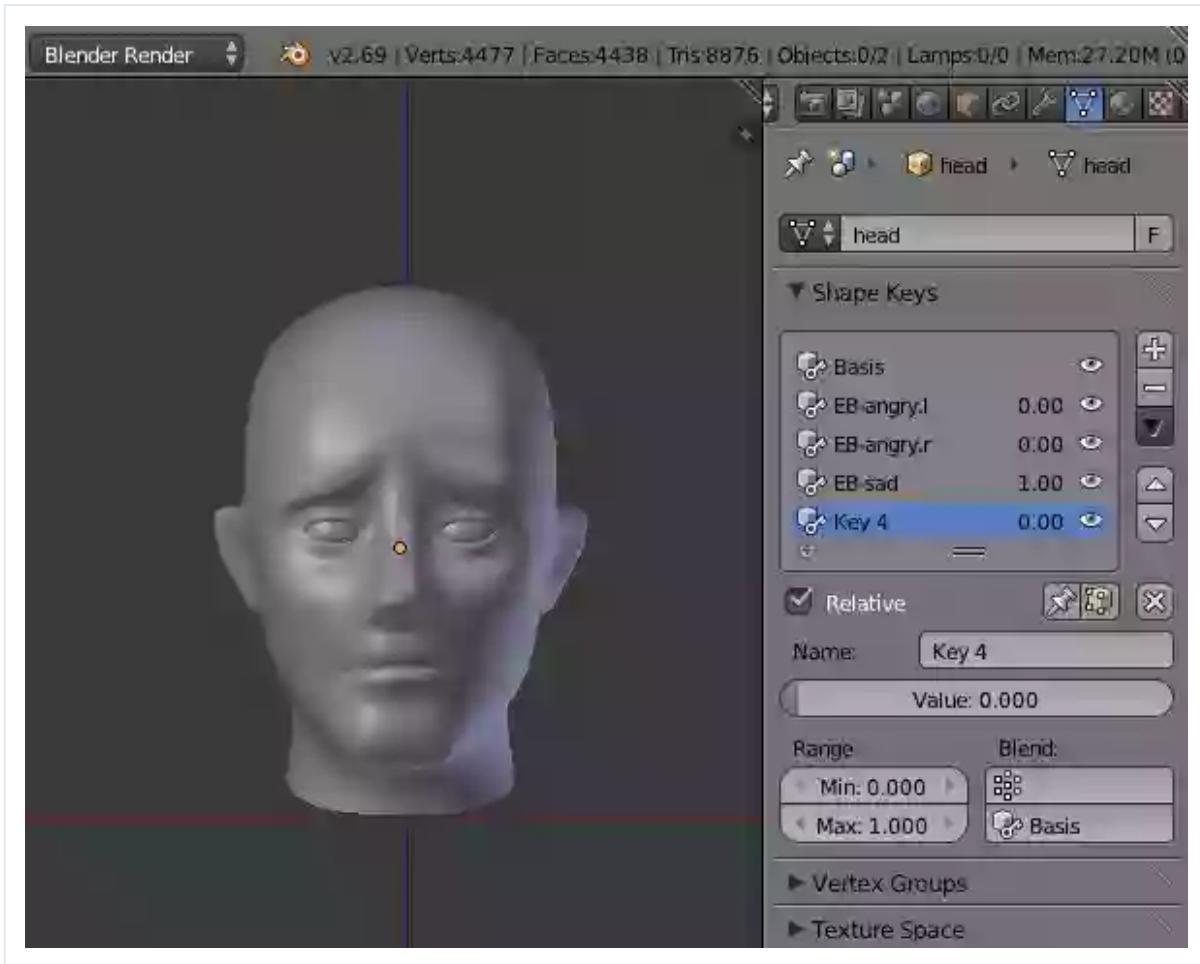
Step 11

We need to split this one again for the left and right sides. We will duplicate this key and assign one to the left, and a new one to the right. Select the **EB-sad** shape key and raise its **value** to **1.00**.

Make sure the other keys are set down to **0.00**, otherwise the new key will be a mix of those keys/shapes. Click on the down **Arrow** and select **New Shape From Mix**.

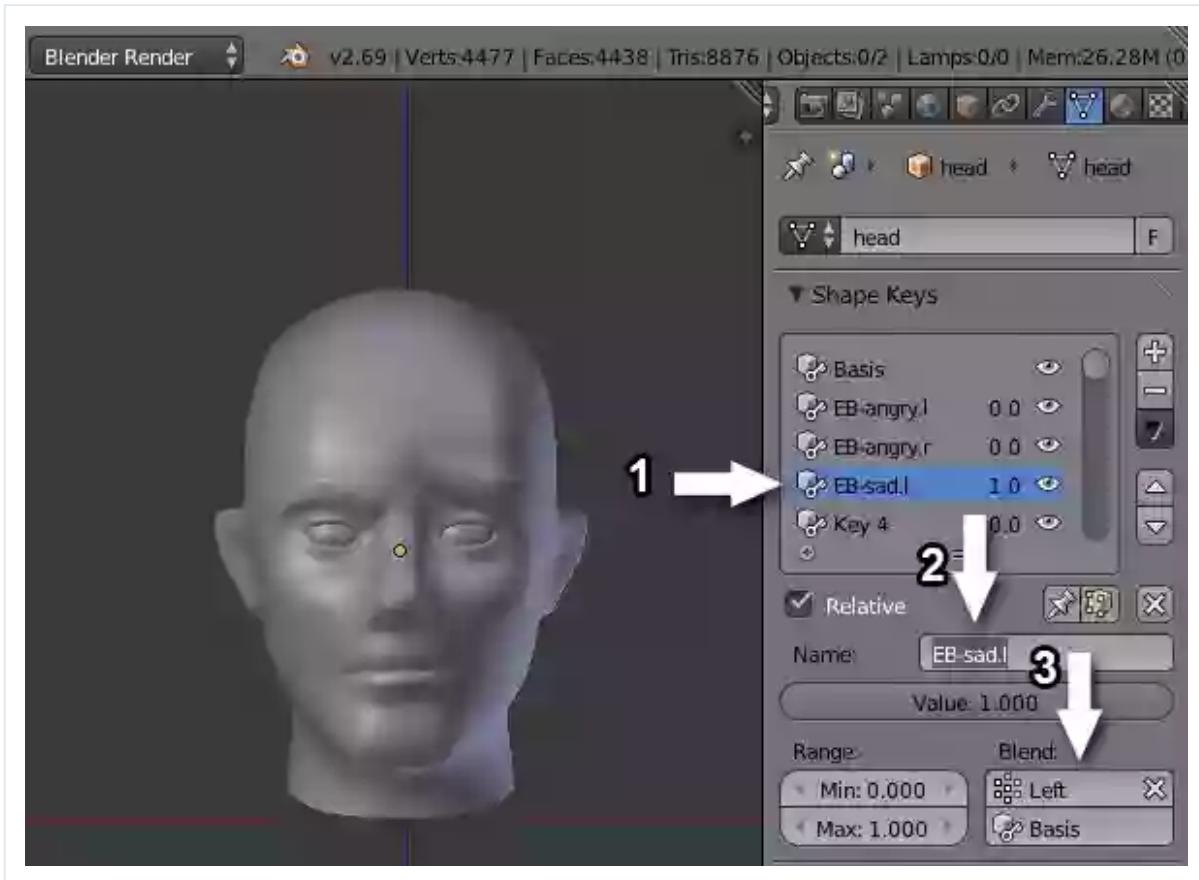


And we will have a duplicate key



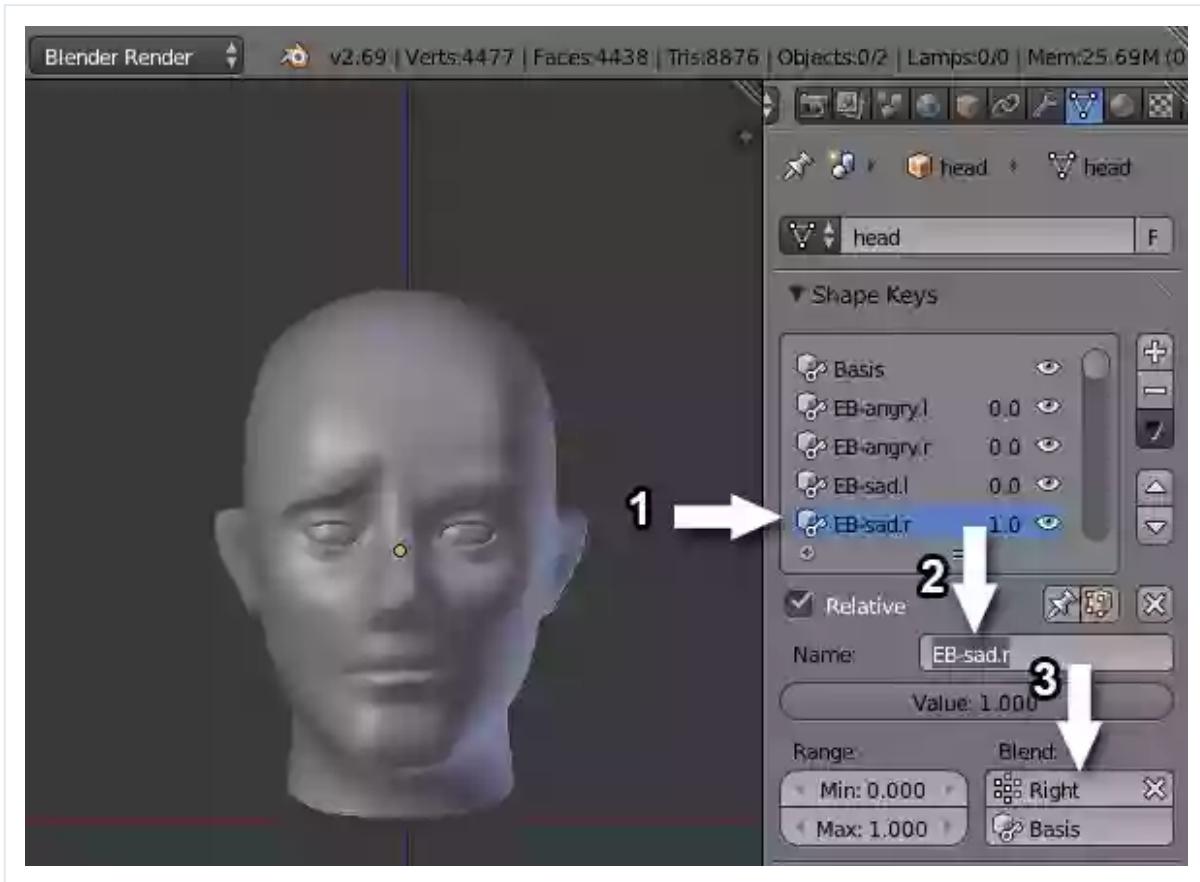
Step 12

Select the **EB-sad** key and rename it to **EB-sad.l** (*L* for left). Under **Blend**, select the **Left** vertex group. This will make the shape key deform only the *left* vertex group. Play with the **Value** slider to test and press **TAB** again to exit **Edit** mode.



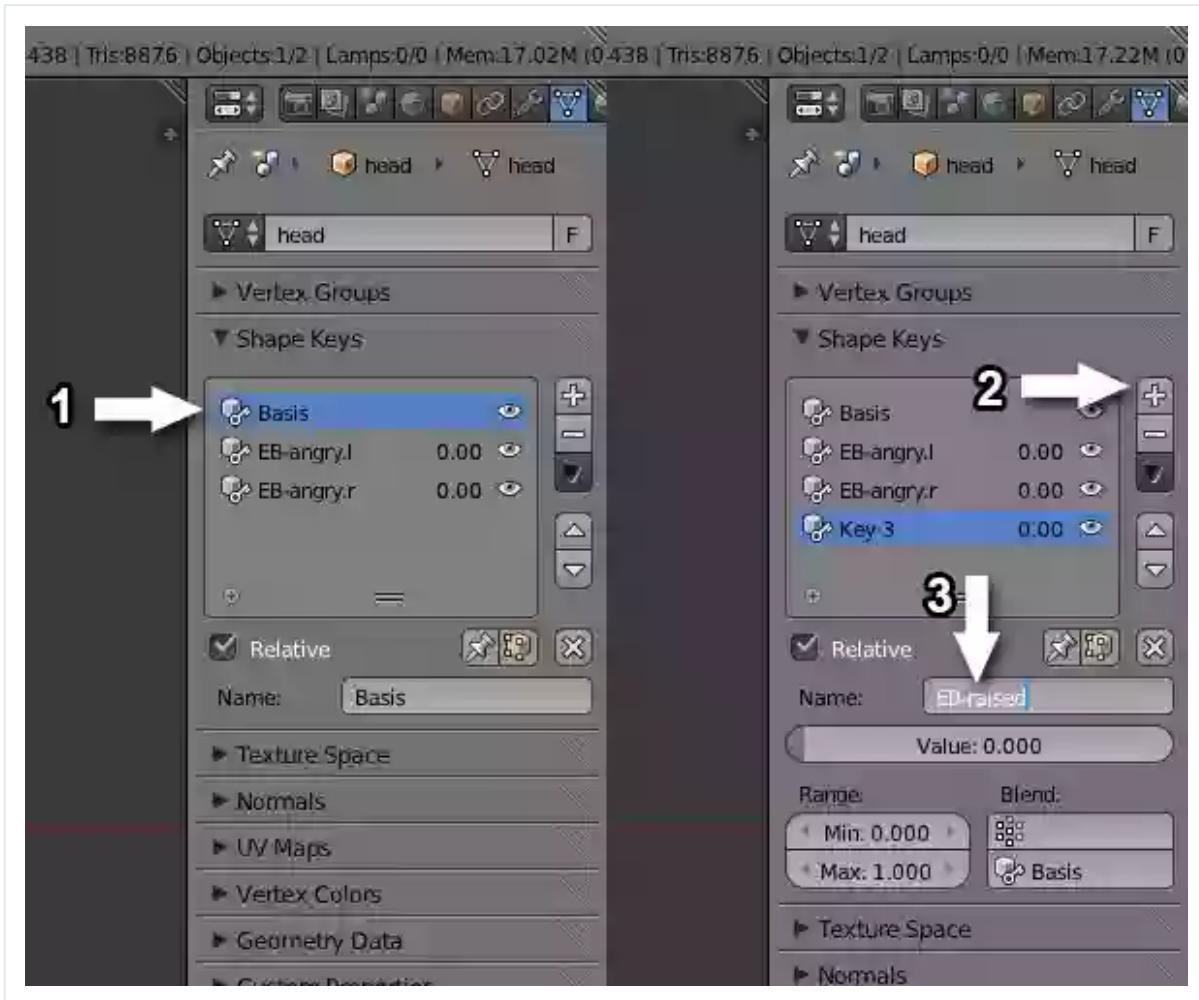
Step 13

Now select the newly created **Shape Key** and rename it **EB-sad.r** (*R* for right). In the vertex group select **Right**. This shape key will only deform the *right* vertex group. Again, drag the **Value** slider to test.



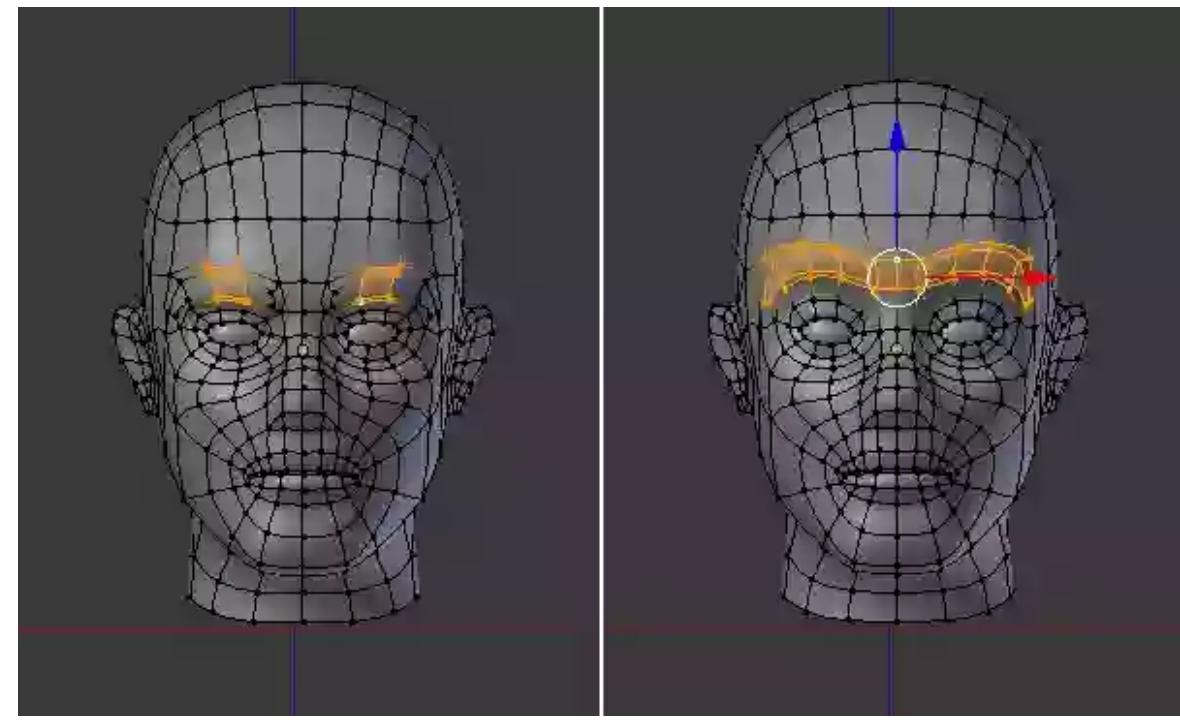
Step 14

We will now create another new shape key. Make sure all the keys are **0.00**. Click on the **+** (plus) button to add a new **Shape Key** with the default shape. Name it **EB-raised** as we will create a shape for eyebrow raised.



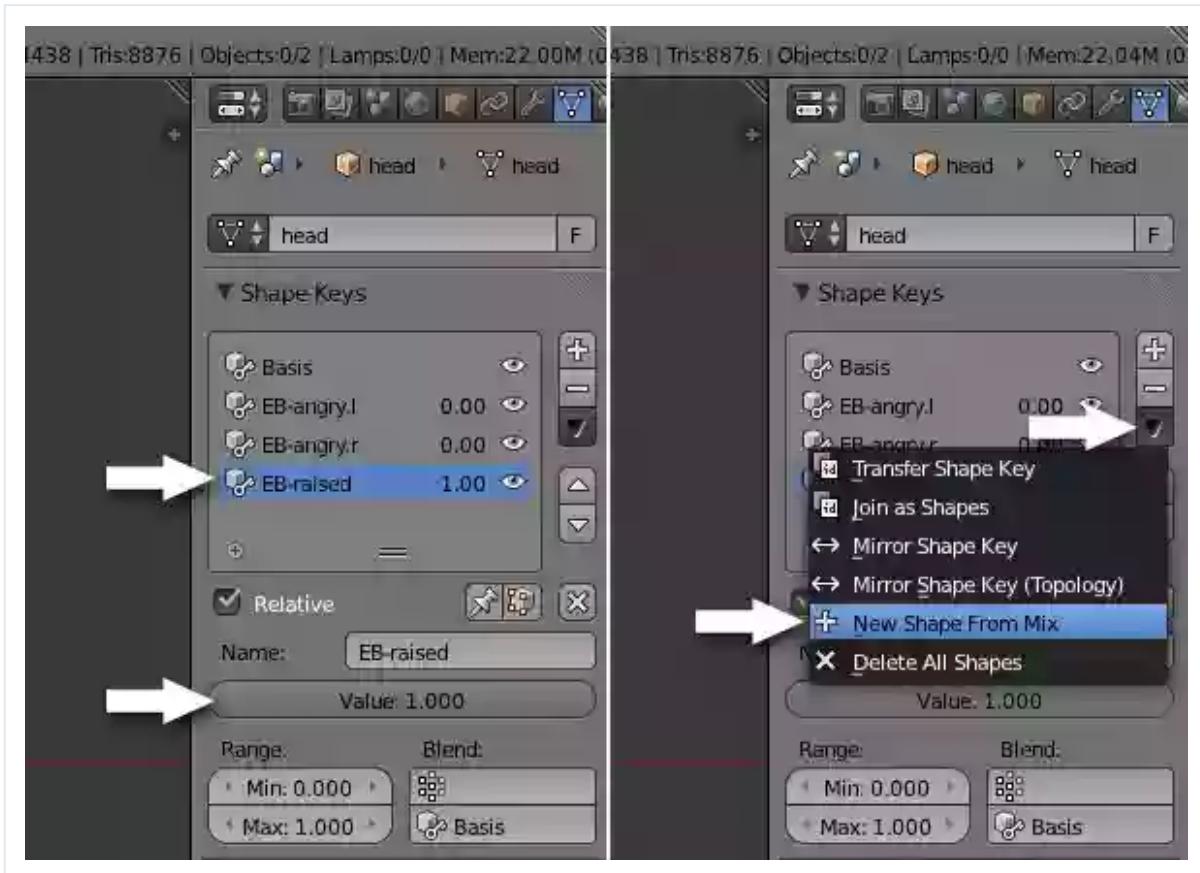
Step 15

Press **TAB** to get into **Edit** mode. Select the eyebrows and raise them upward, and then press **TAB** again to exit **Edit** mode.

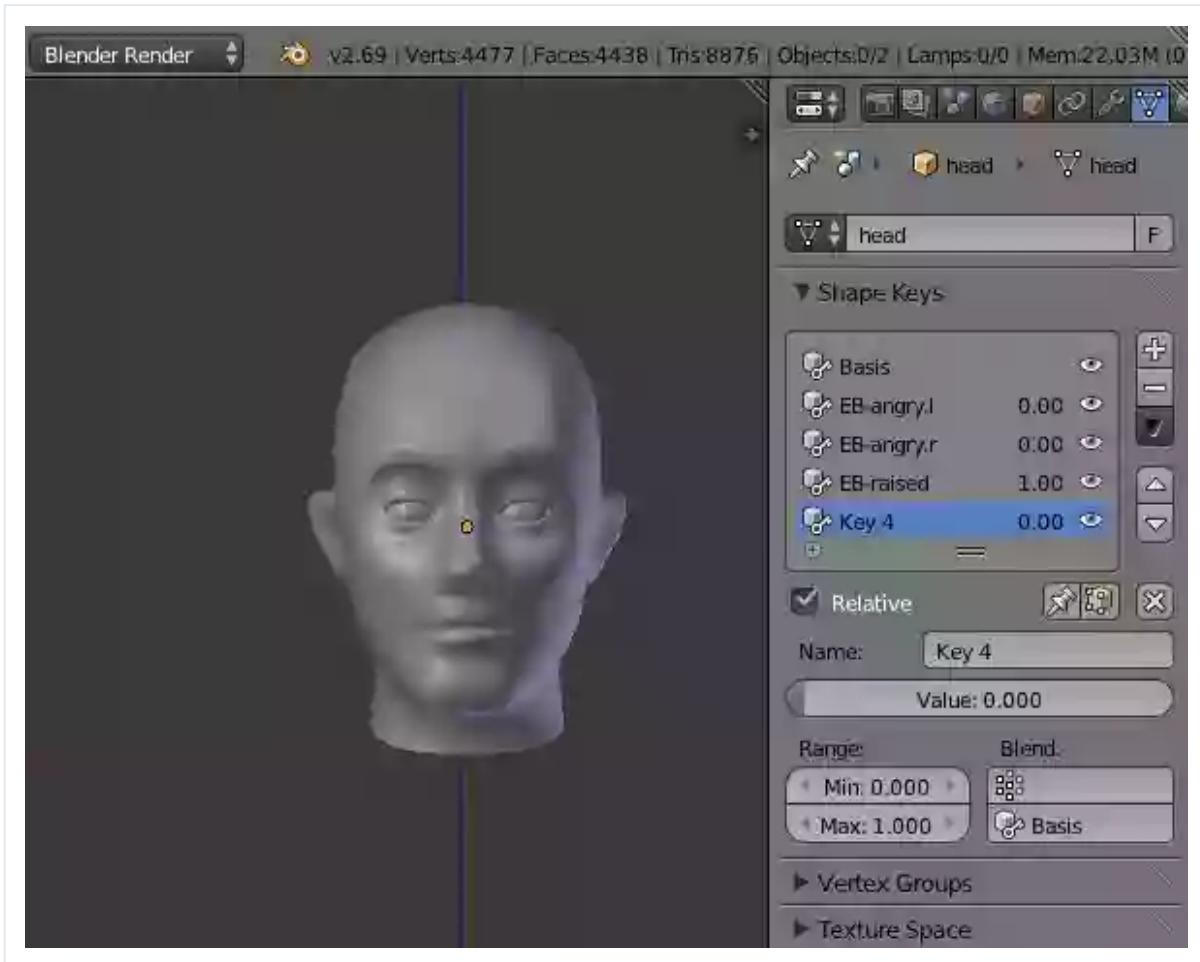


Step 16

We need to split this one again for the left and right. We will duplicate this key and assign one to the left, and a new one to right. Select the **EB-raised** shape key and increase its **Value** to **1.00**. Make sure the other keys are set to **0.00**, otherwise the new key will be a mix of those keys/shapes. With the **EB-Raised** key selected, click on the down **Arrow** and select **New Shape From Mix**.



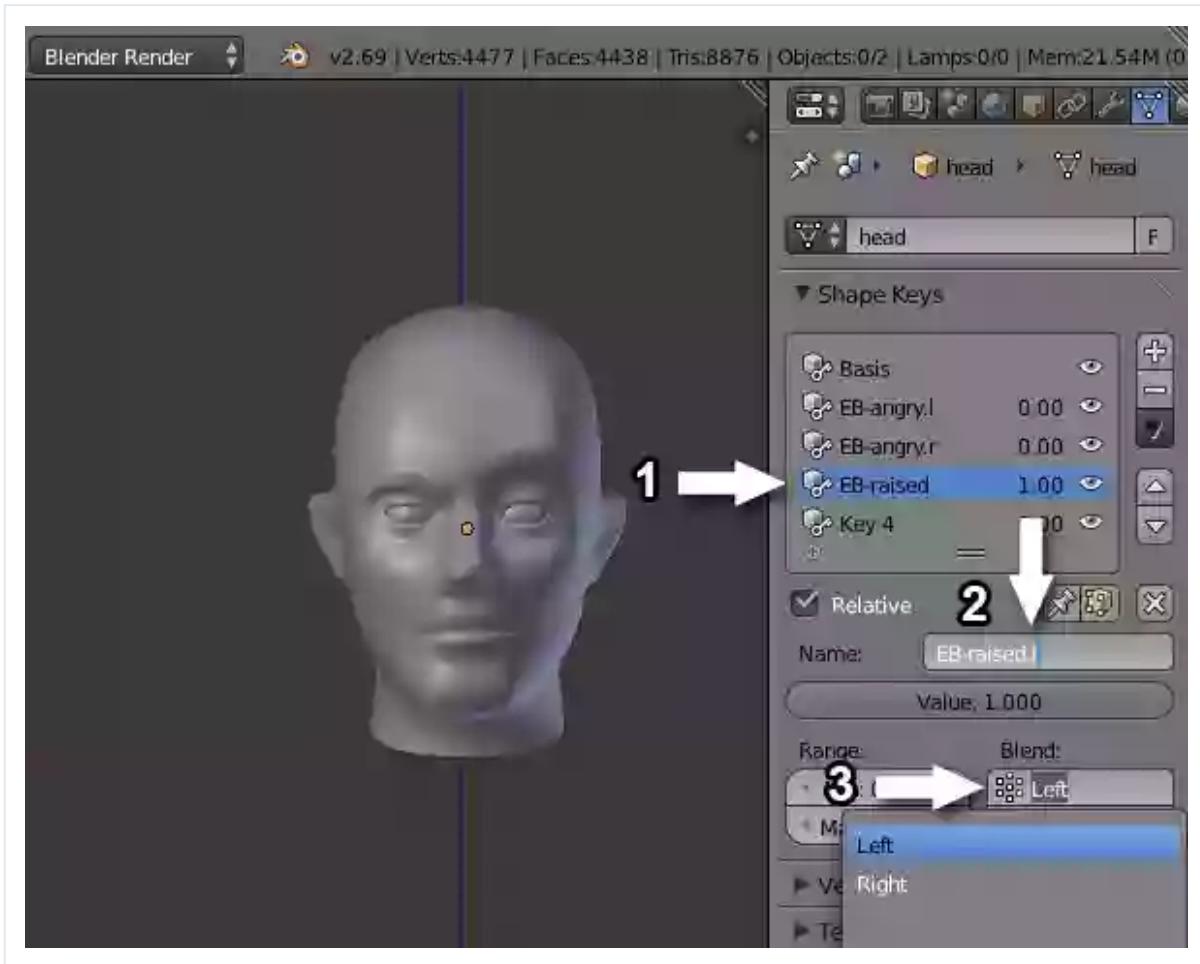
And we will have a duplicate key.



Step 17

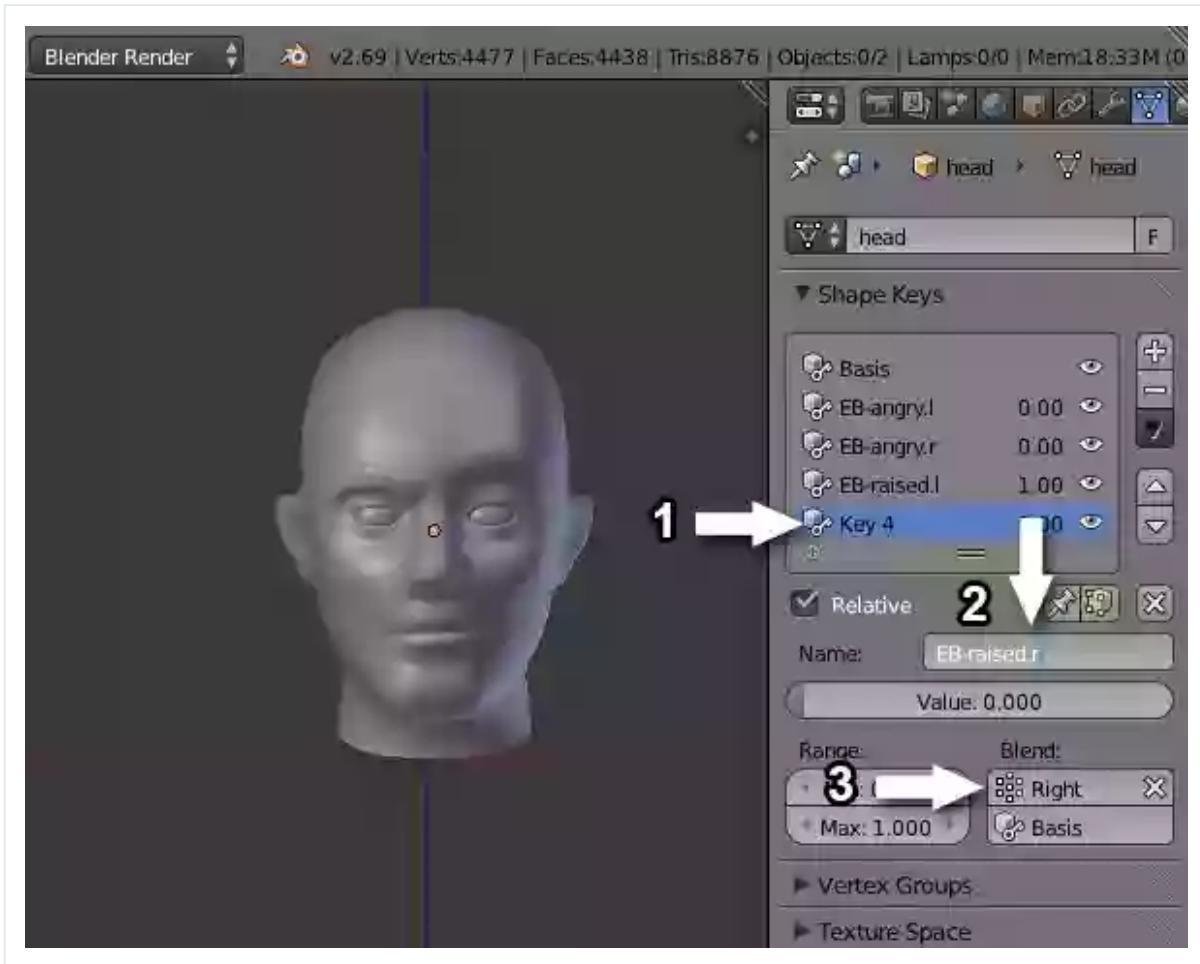
Select the **EB-raised** key and rename it **EB-rasied.L** (*L* for Left).

Under **Blend**, select the **Left** vertex group. This will make the shape key deform only the *left* vertex group. Again, play with the **Value** slider to test.



Step 18

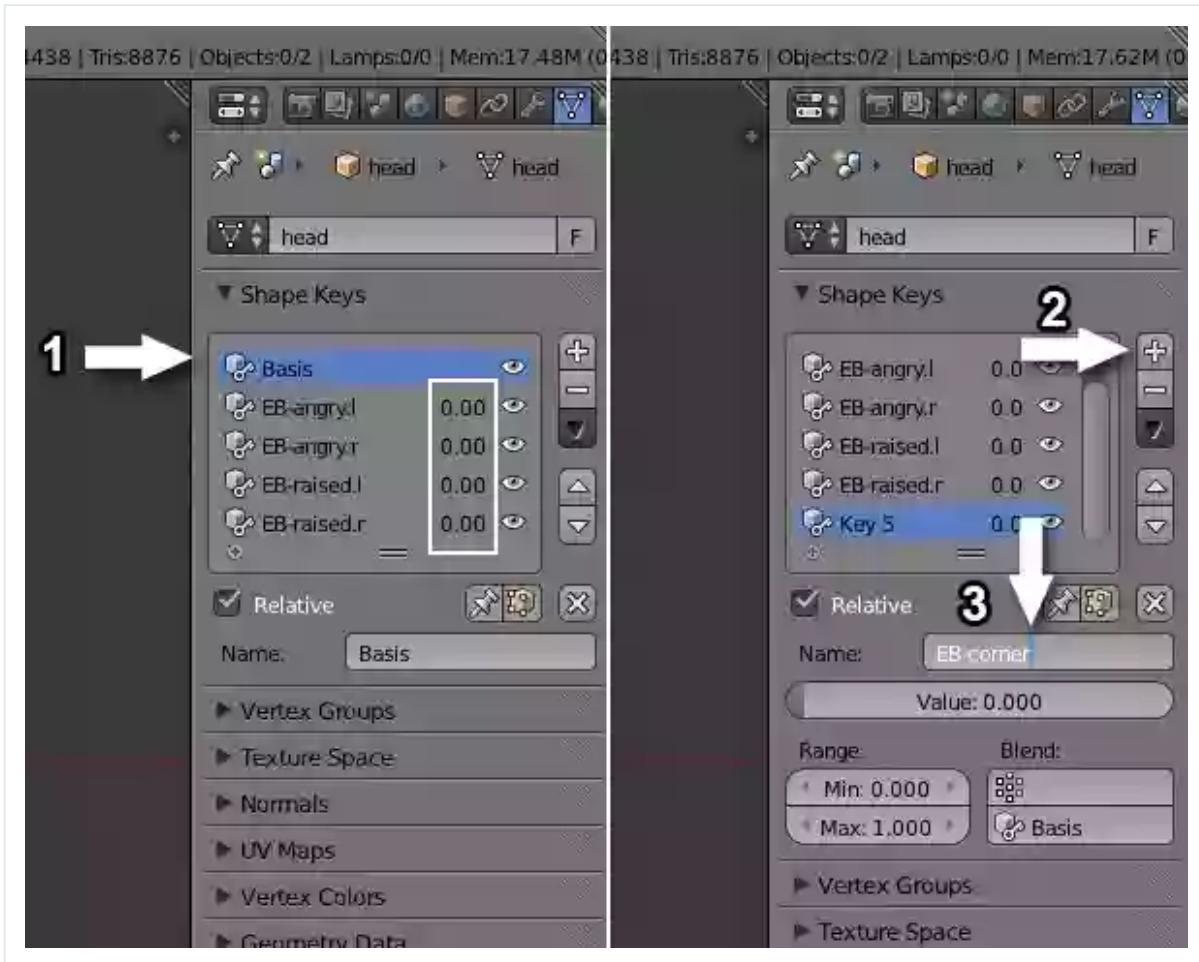
Now select the newly created **Shape Key**. Rename it **EB-raised.r** (*R* for right), and in the **Vertex Group** select **Right**. This shape key will only deform the *right* vertex group. Always drag the **Value** slider to test.



Step 19

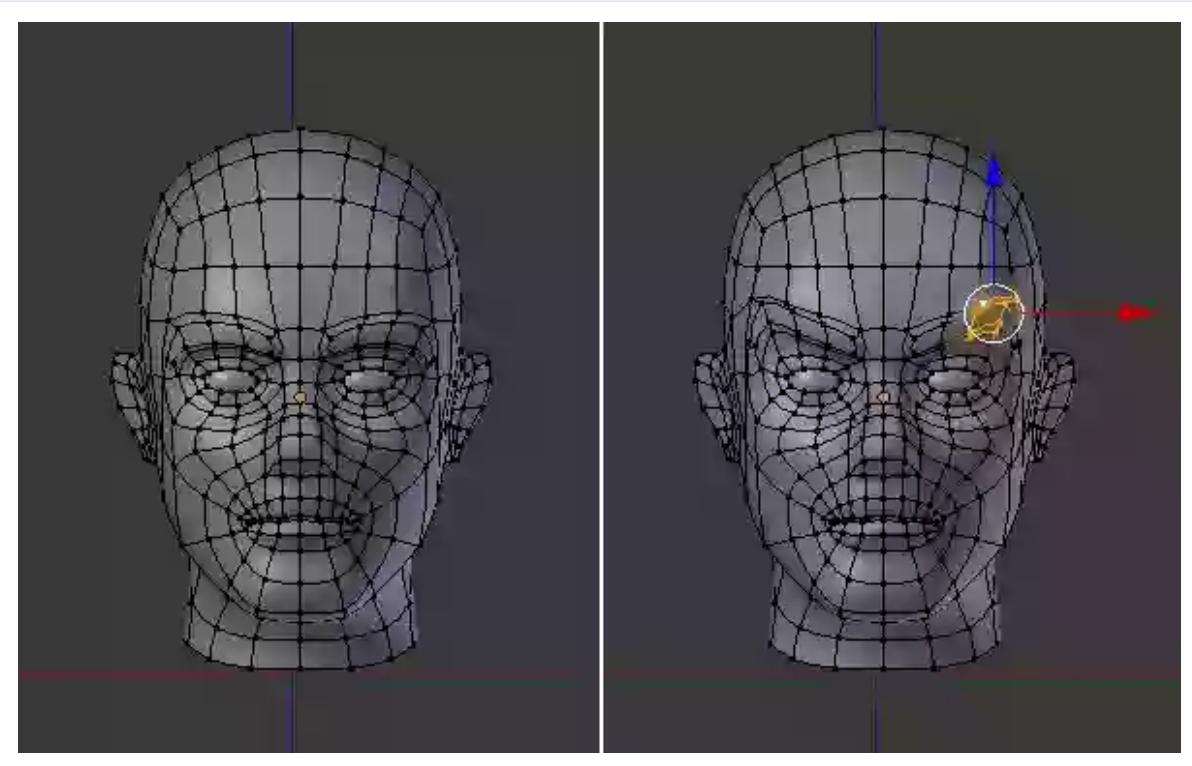
We will now create another new shape key (this will be the last for the eyebrows.) Make sure all the keys are set to **0.00**. Click on the **+** (plus) button to add a new **Shape Key** with the default shape.

Name it **EB-corner** as we will create a shape for the last corner of the eyebrow, just like in a "devil" smile.



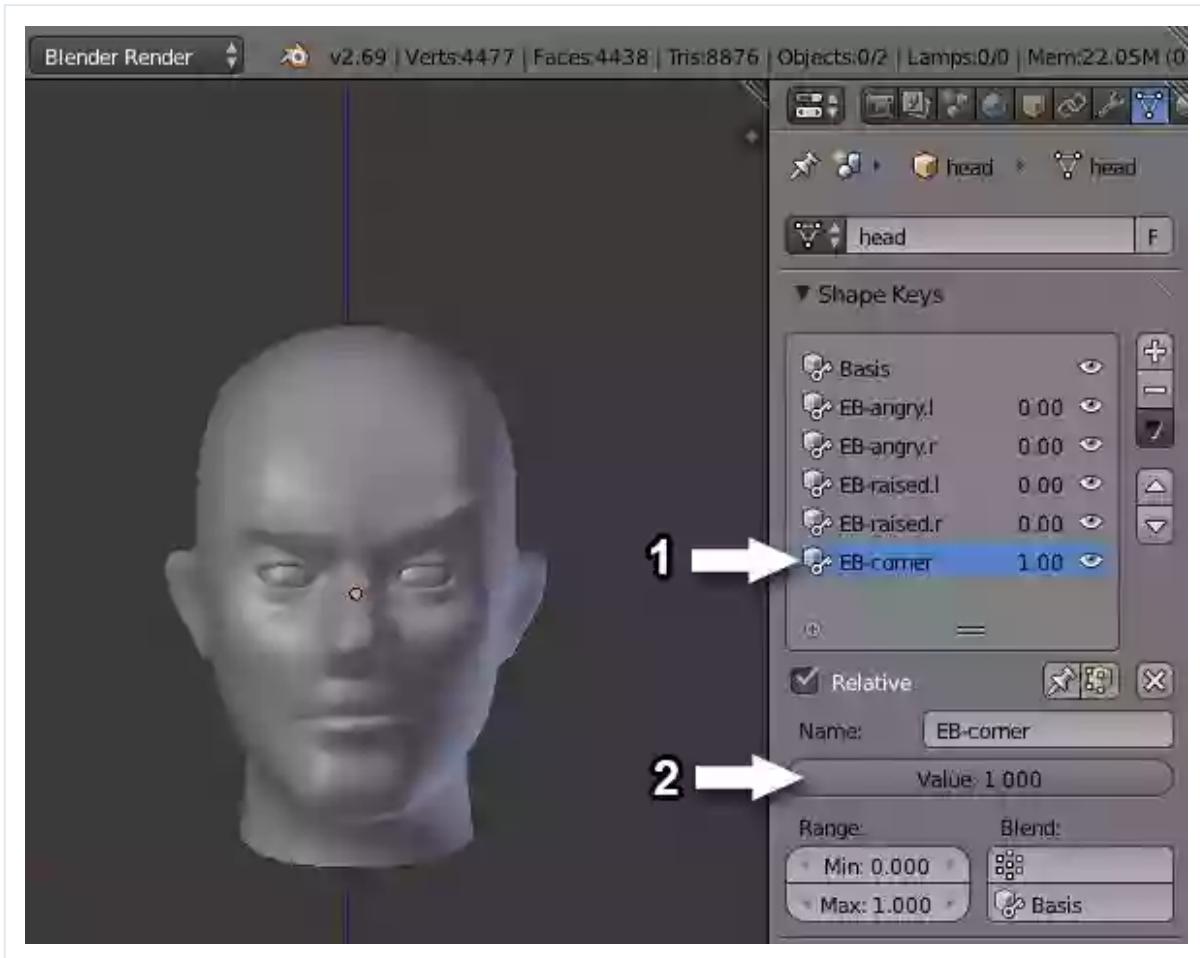
Step 20

Press **TAB** to enter into **Edit** mode. Raise the corner of the eyebrows (just a little bit). And then press **TAB** again to exit **Edit** mode. Play with the **Value** slider to test.

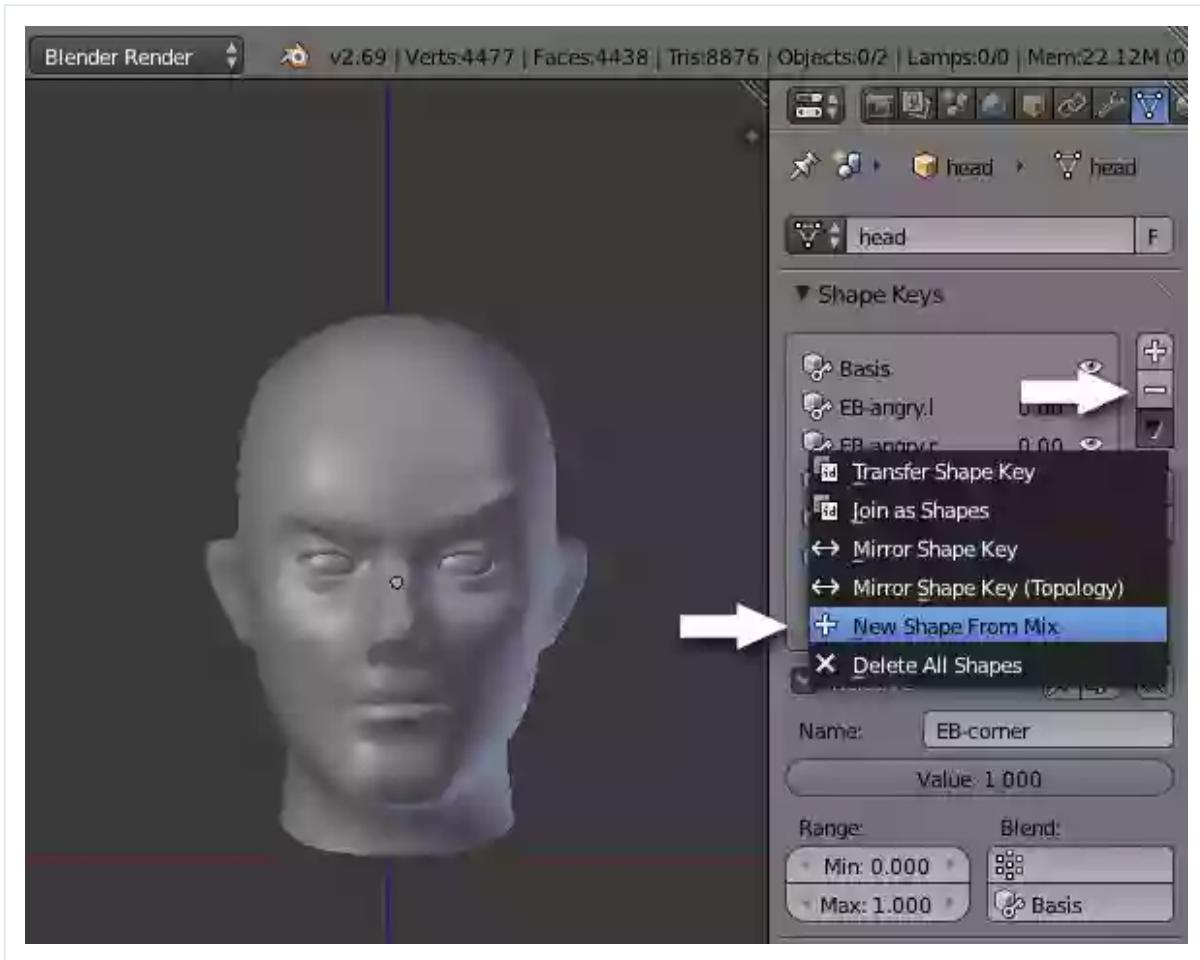


Step 21

Again we will split this shape key into two. Press **TAB** to exit **Edit** mode and raise the **Value** slider to **1.00**.

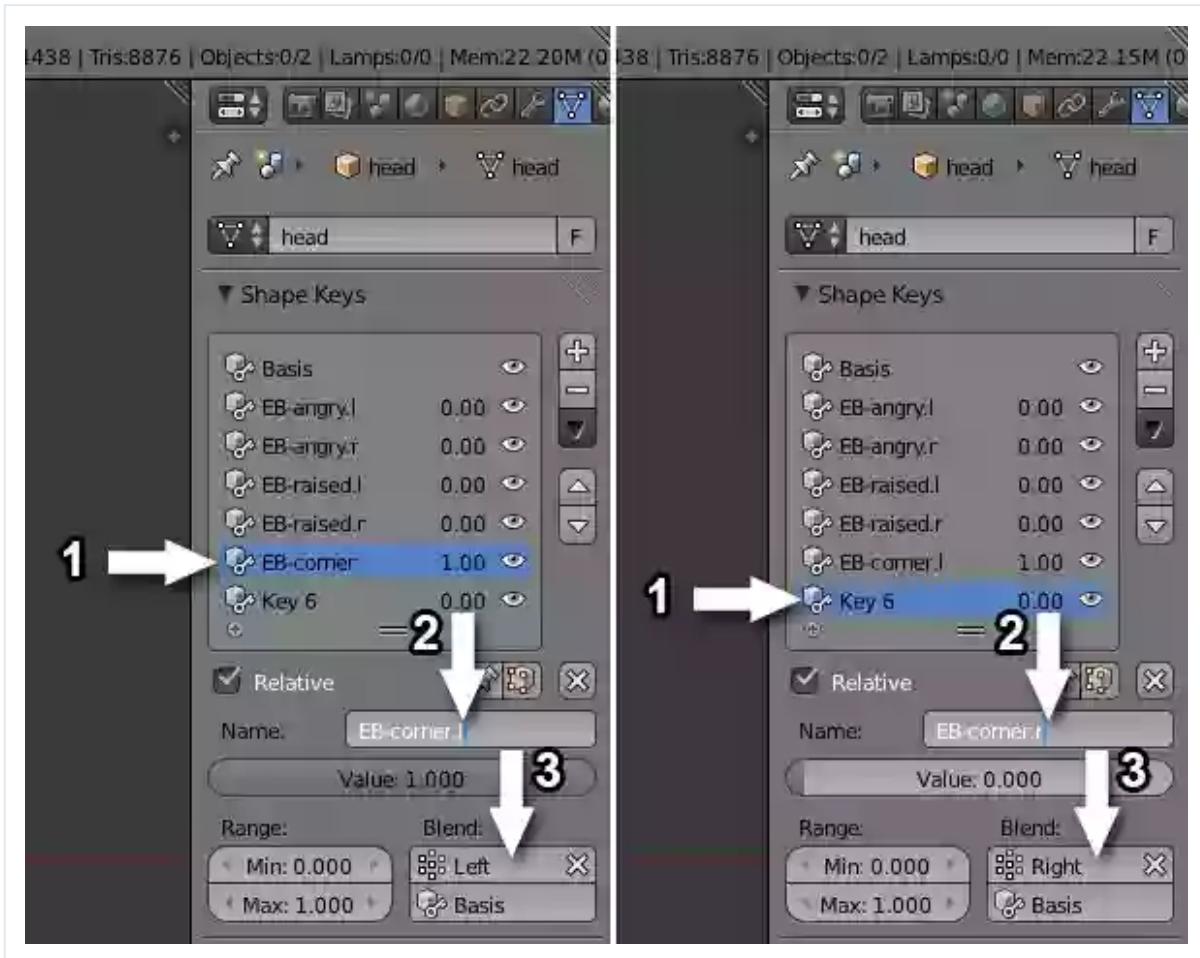


Press the down Arrow button and select **New Shape Form Mix**



Step 22

Select the original shape key - **EB-corner**, and rename it **EB-corner.l** for left. Under **Blend**, assign the **Left** vertex group so that it only affects the *left* group. Similarly, do the same for the new shape key - Rename it **EB-corner.r**, and assign it to the **Right** vertex group.

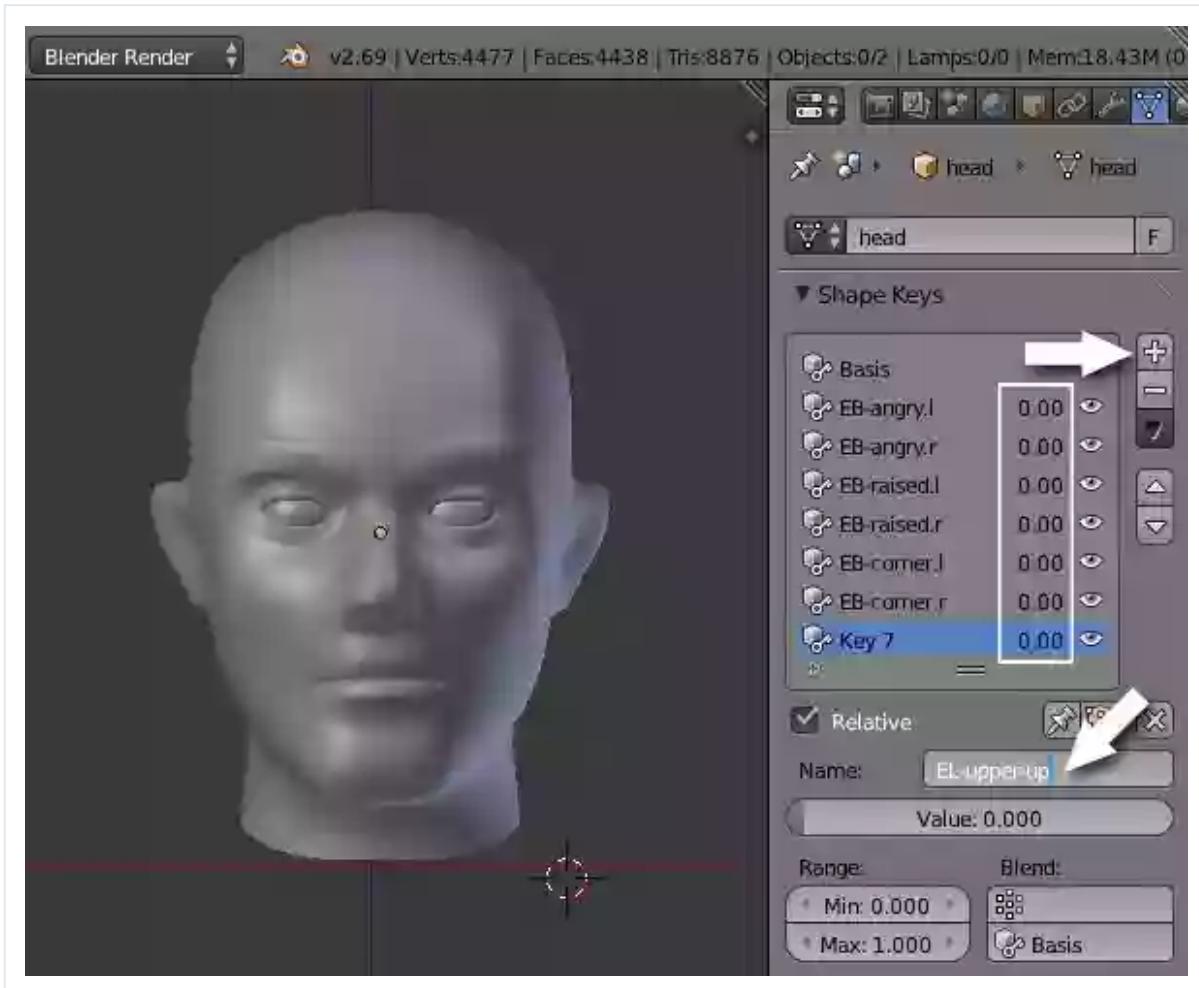


Now all the shape keys for the eyebrows are done, and we will move onto the eyelids.

Step 23

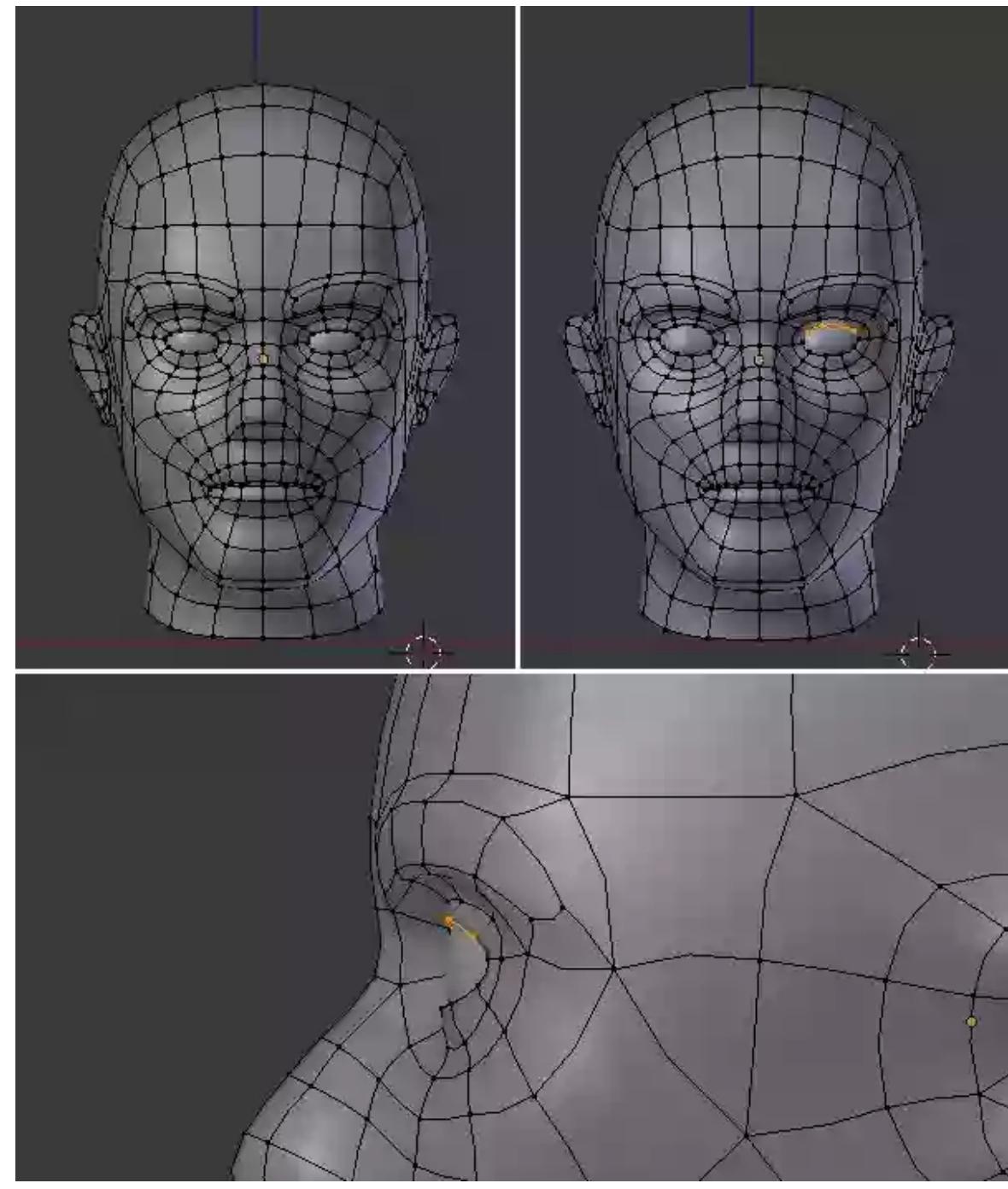
Create a new **Shape Key**. Make sure that all the keys are at **0.00**.

Click on the **+** (plus) button to add a new **Shape Key**. Name it **EL-upper-up** (for the upper eyelid moving upwards.)



Step 24

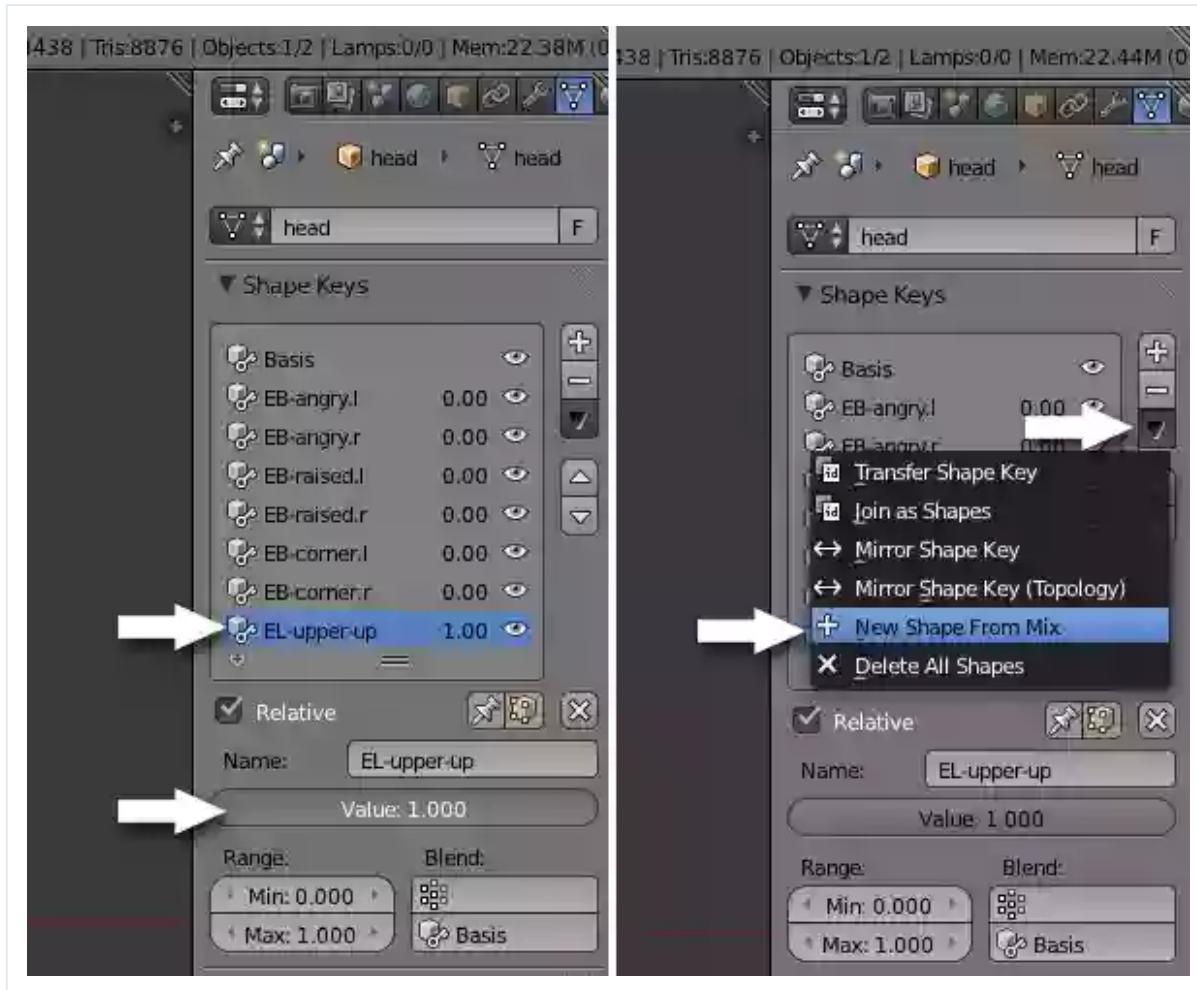
In **Edit** mode, pull up the upper eyelid. It's also a good idea to check from a side view too.



Press **TAB** to exit **Edit mode**.

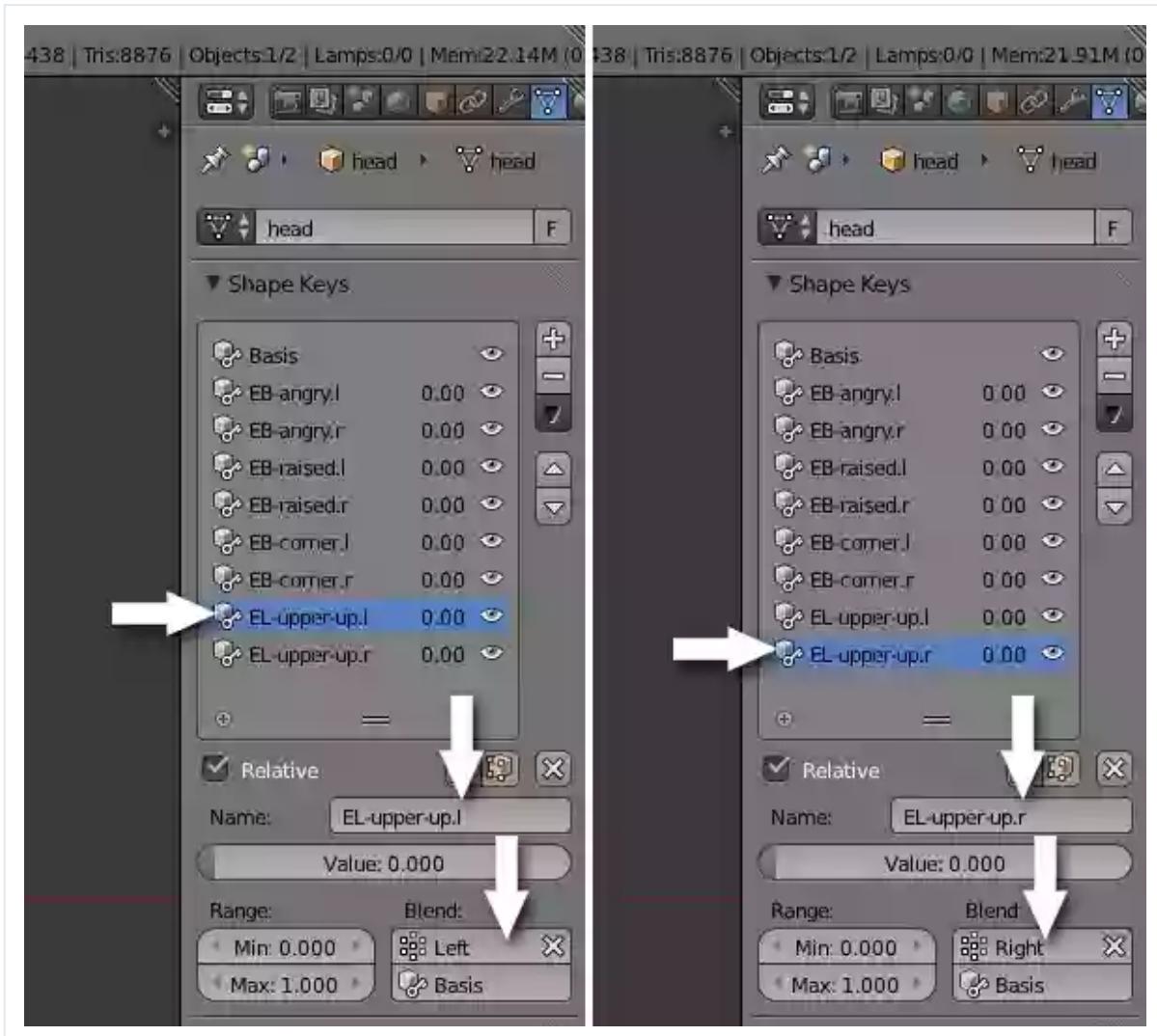
Step 25

Now again, (like we did previously) duplicate this shape key.
Select the new key and increase the **Value** to **1.00**. Click on the down Arrow button and select **New Shape Form Mix**.



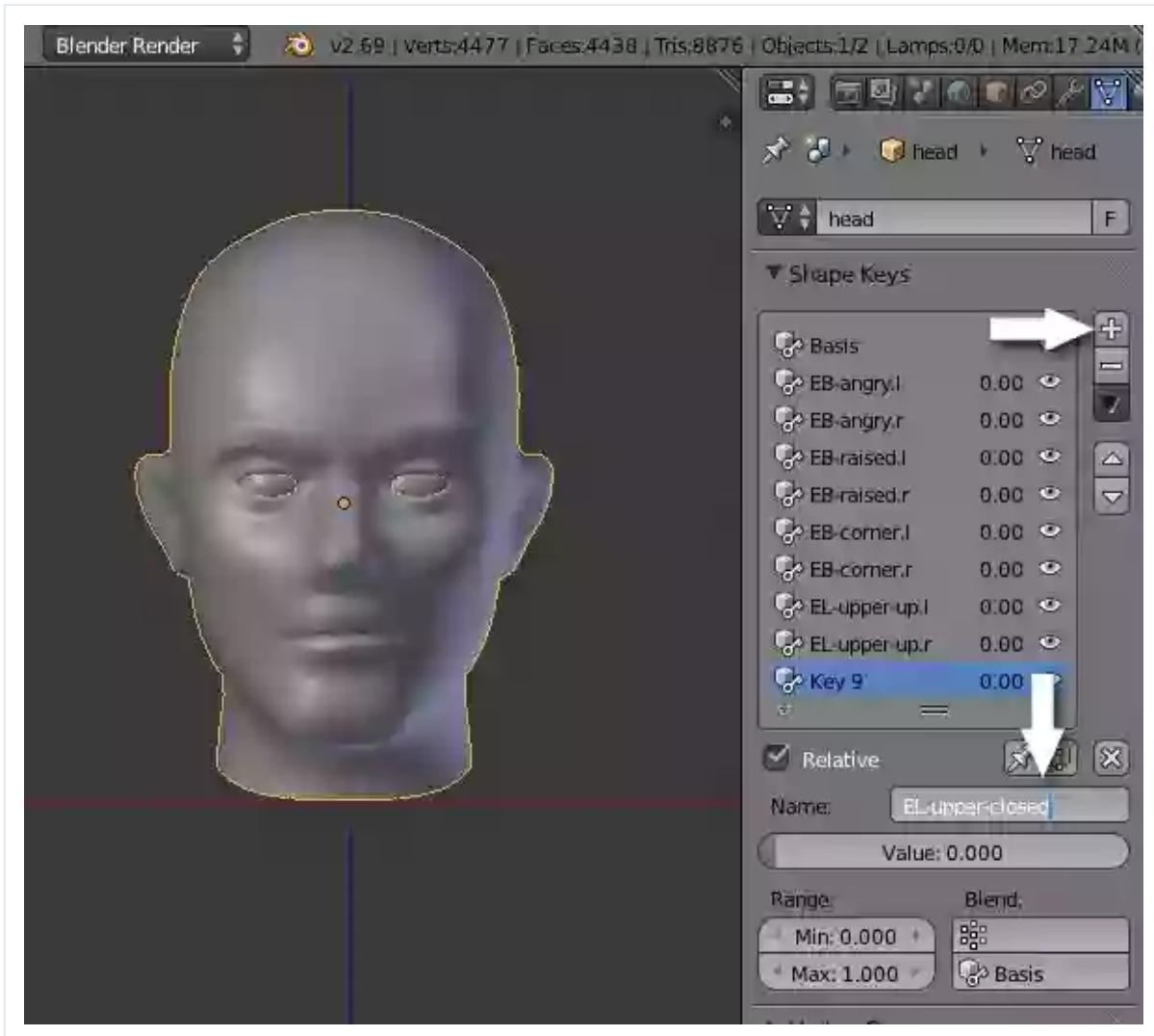
Step 26

Rename the keys with the **.L** and **.R** extensions. Assign the **Left** vertex group to **EL-upper-up.l**, and the **Right** to **EL-upper-up.r**.



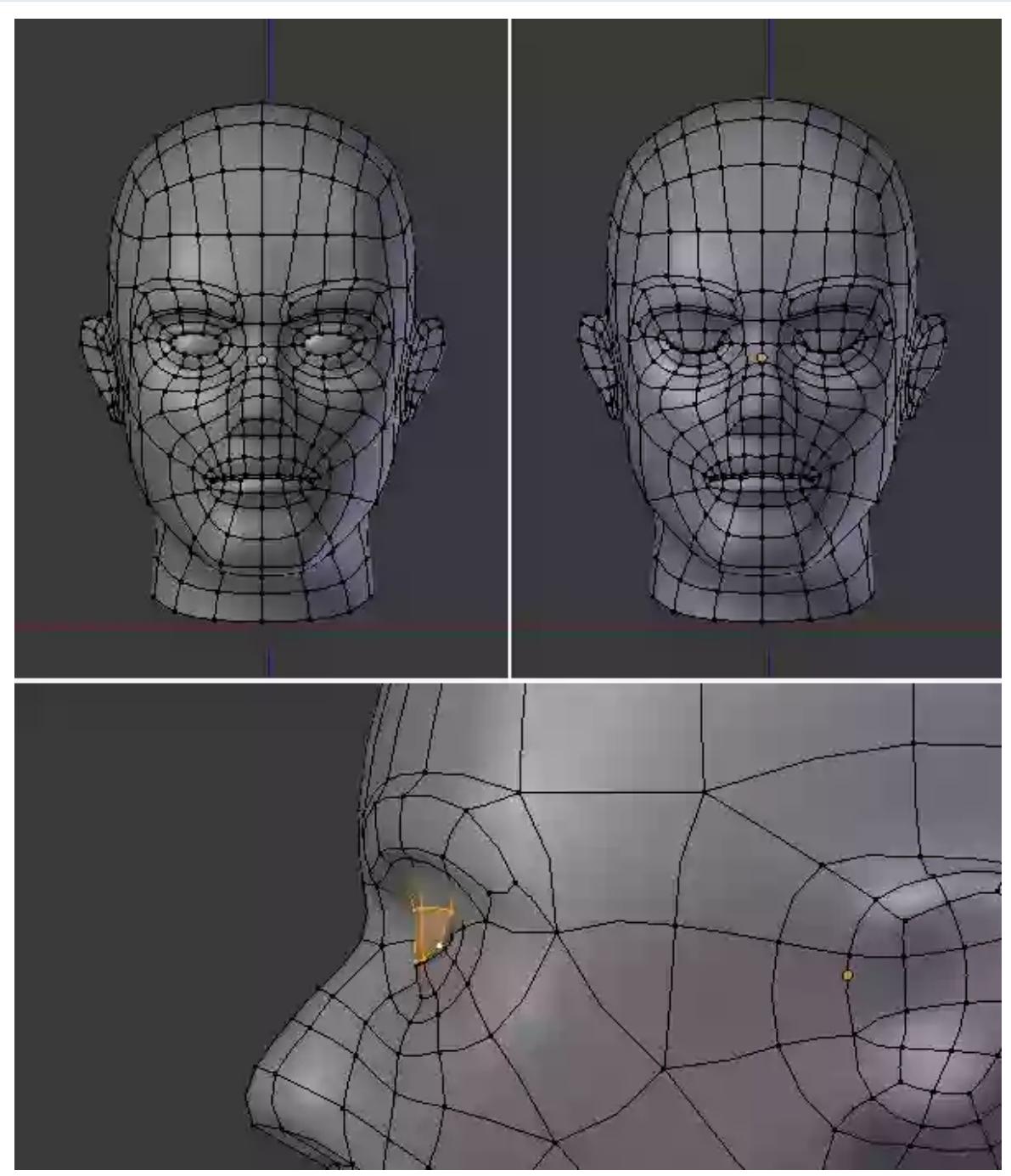
Step 27

Next create a new **Shape Key** for the upper eyelids closed. Make sure all the keys have a value of **0.00** before creating a new one. Click on the **+** (plus) button and name it **EL-upper-closed**.



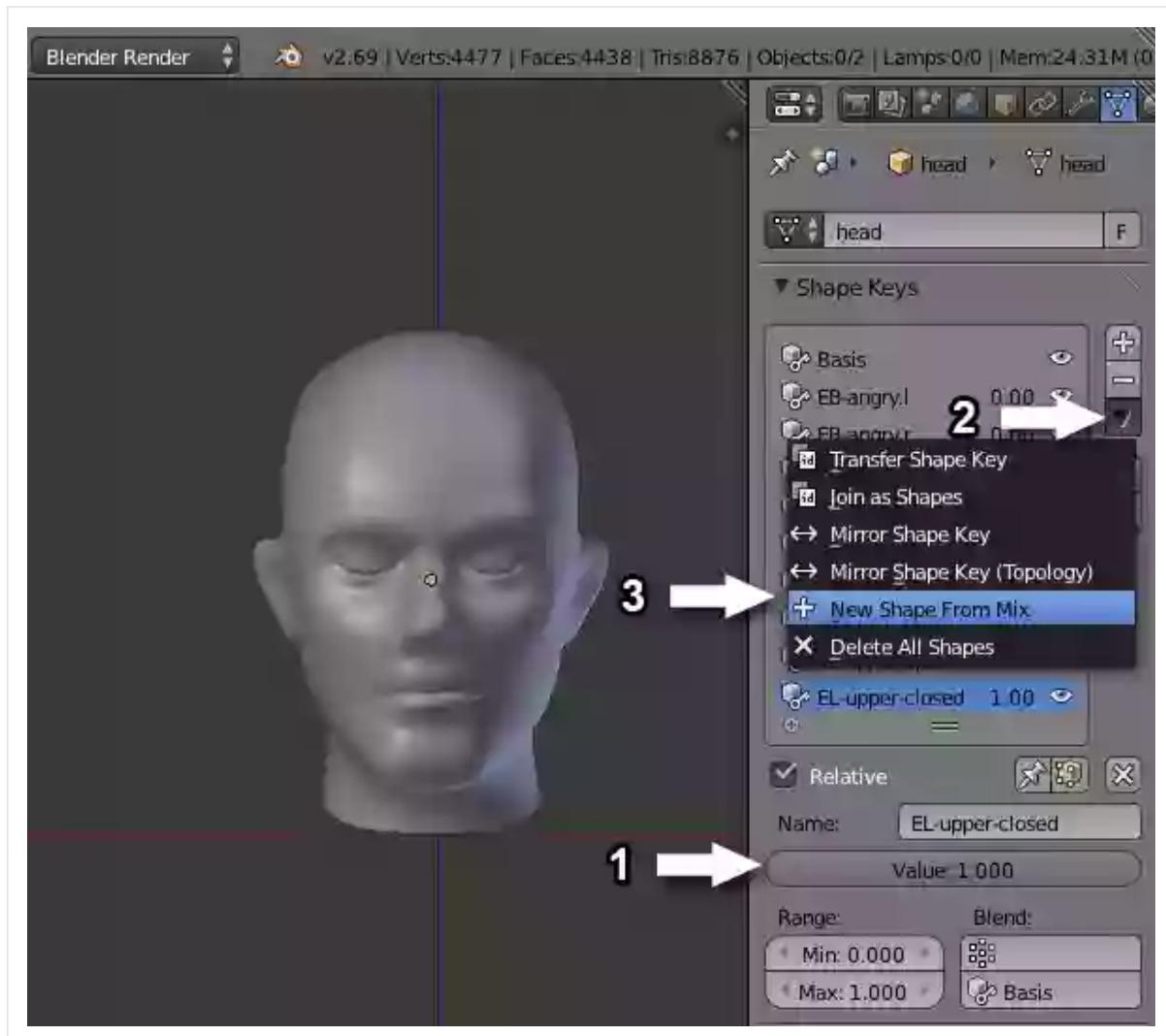
Step 28

Press **TAB** to edit the geometry. Pull down the eyelids and the adjoining vertices to give it shape, and remember to check from the side also.



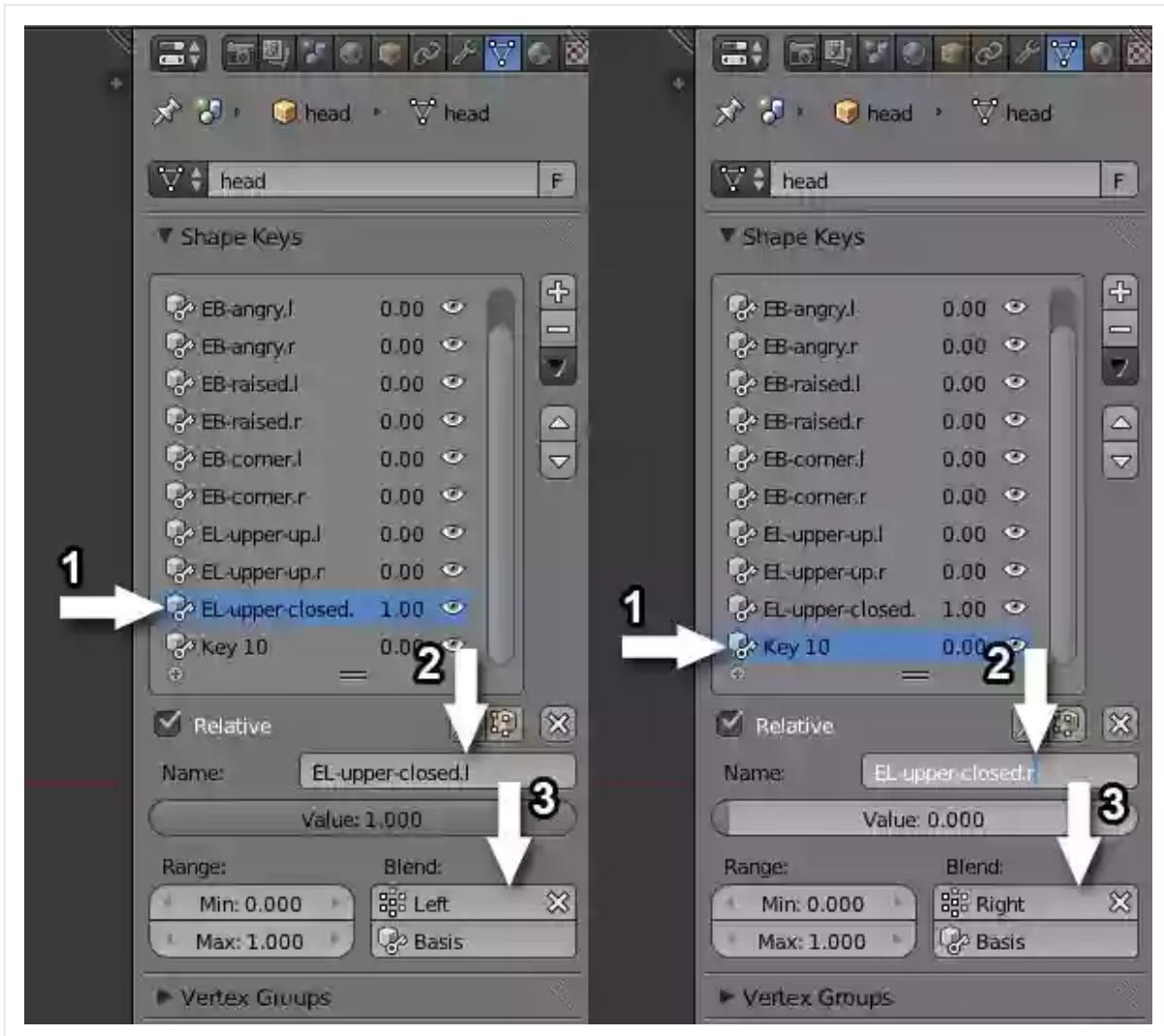
Step 29

Press **TAB** to get out of **Edit mode**. Again, we will duplicate it and assign one to the left and a new one to the right. Turn up the **Value slider** to **1.00**, press the down **Arrow** button and select **New Shape From Mix**.



Step 30

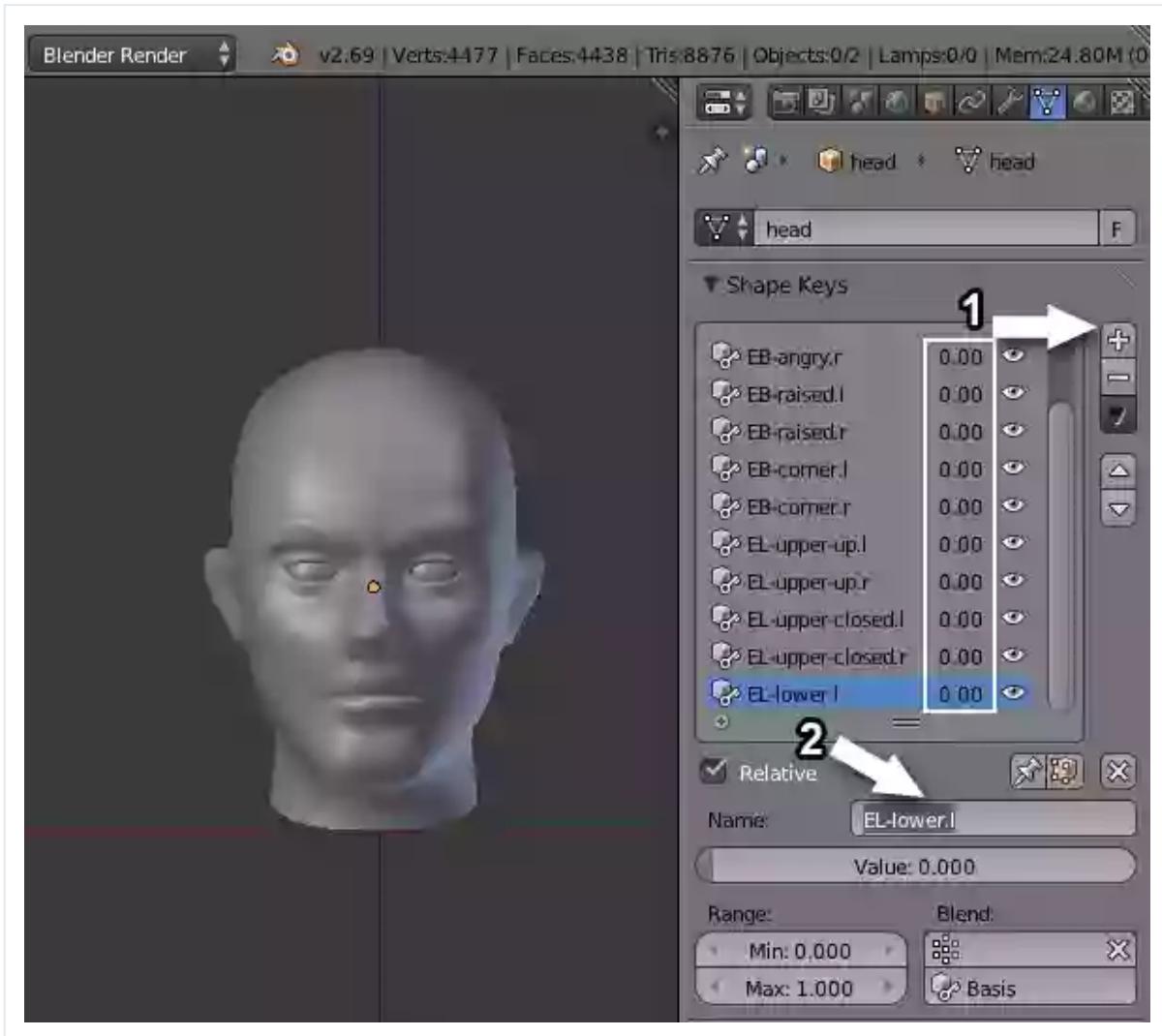
Again, like the others, rename the keys with the **.L** and **.R** extensions. Assign the **Left** vertex group to **EL-upper-closed.l**, and the **Right** to **EL-upper-closed.r**.



Step 31

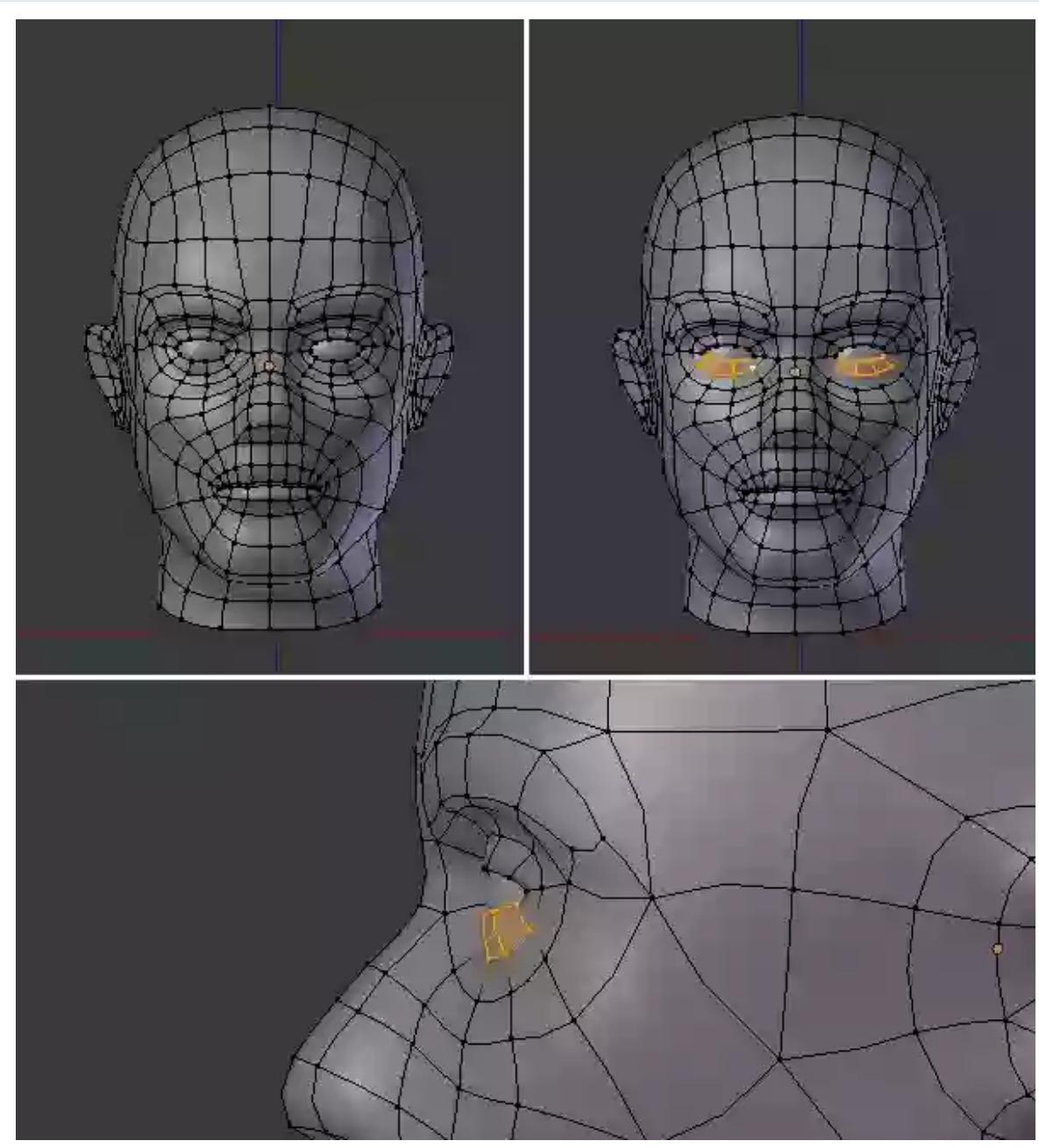
Now we will create a new shape key for the lower lid movement.

Make sure all the values are back to **0.00**. Click on the **+** (plus) button to create a new shape. To save time, we will name the new one with the extension **.l**, as in **EL-lower.l**.



Step 32

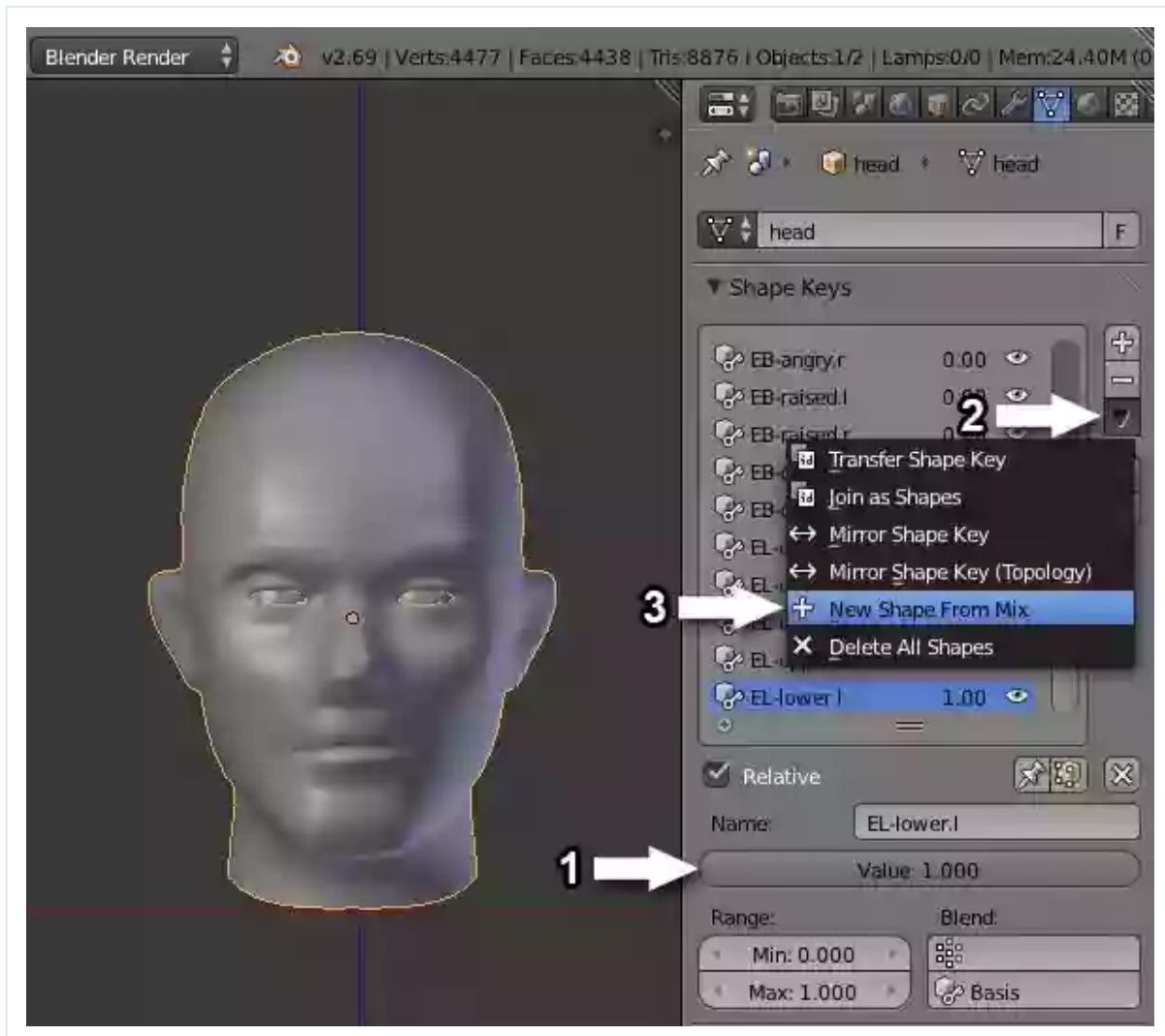
Press **TAB** and edit the shape. The lower eyelid does *not* go all the way up to the top. Again, check form the side also.



Step 33

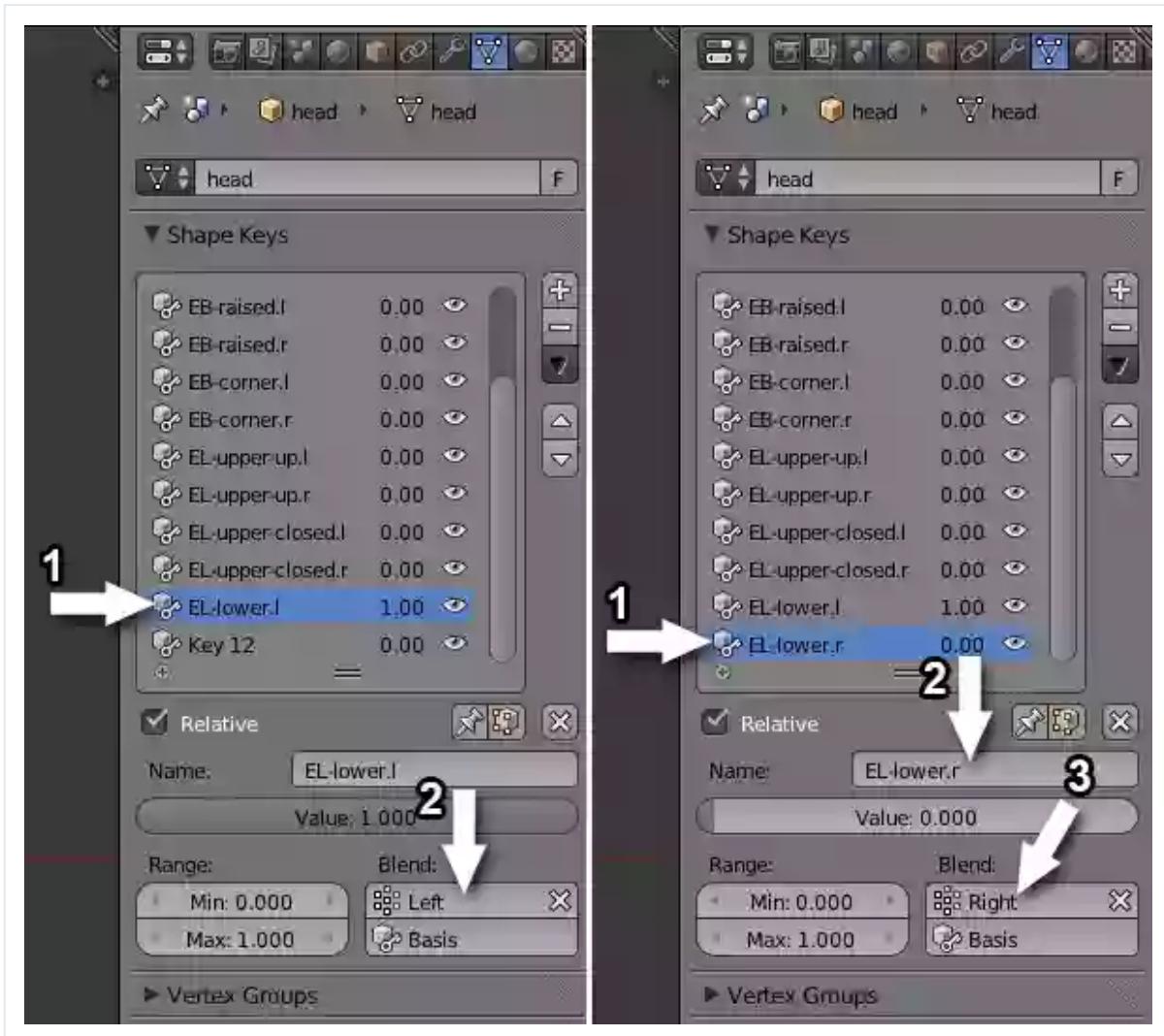
Press **TAB** to exit **Edit** mode. Again we will duplicate this key to split it into the left and right shapes. Increase the **Value** slider to

1.00, and click on the down Arrow button and select **New Shape From Mix**.



Step34

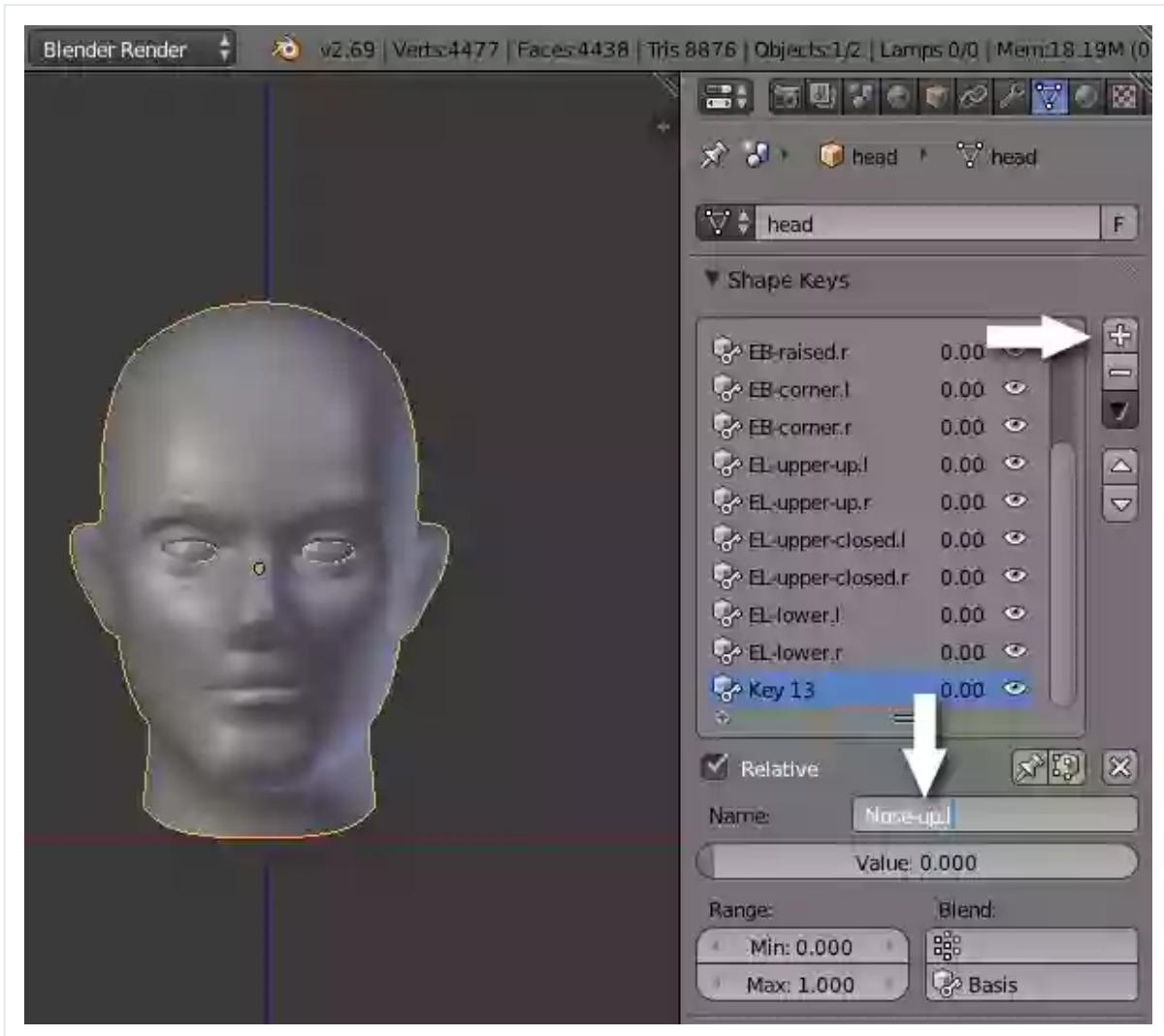
Select the previous shape key (**EL-lower.l**) and assign it to the **Left** vertex group. Select the new key and rename it **EL-lower.r** and assign it to the **Right** vertex group in the **Blend** options.



Our eye shapes are now complete.

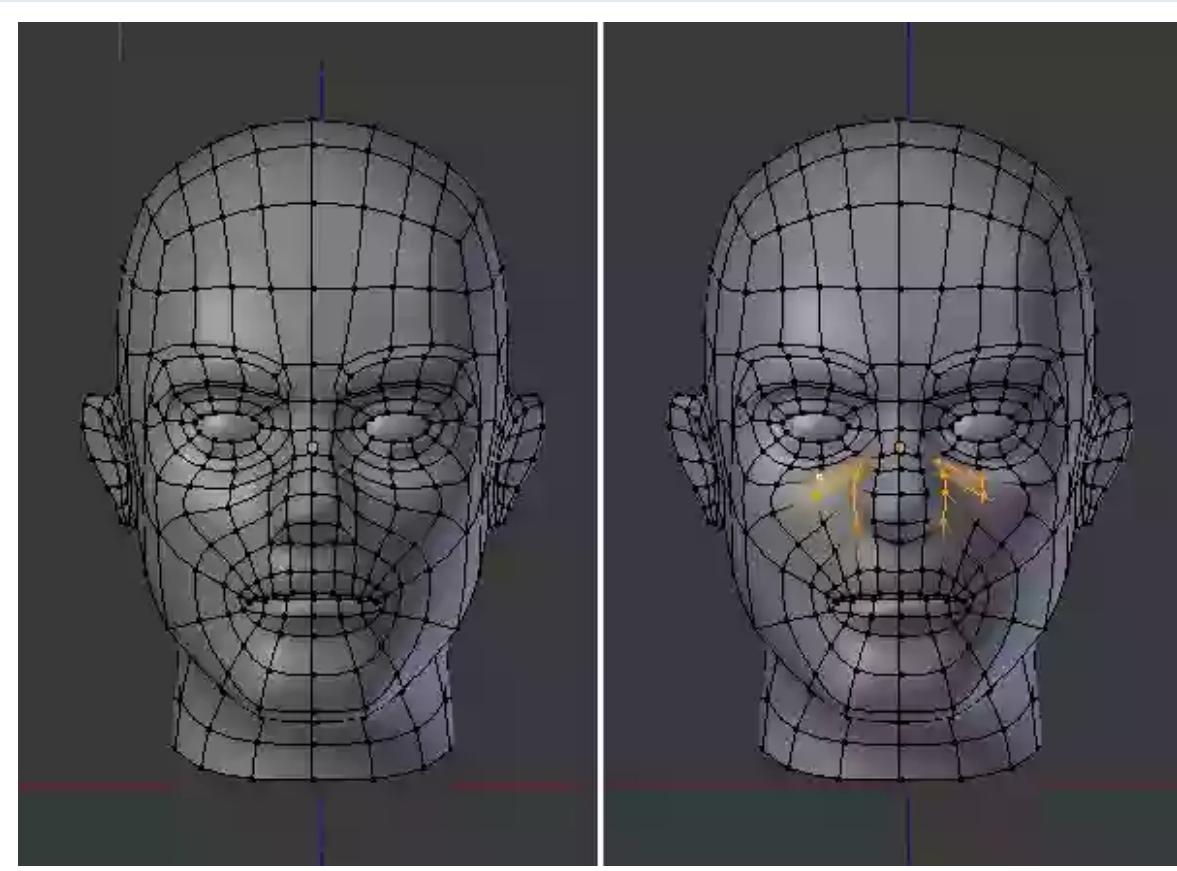
Step 35

We will now move onto the nose area. Click on the **+** (plus) button to add a new **Shape Key**, and rename it **Nose-up.l**.



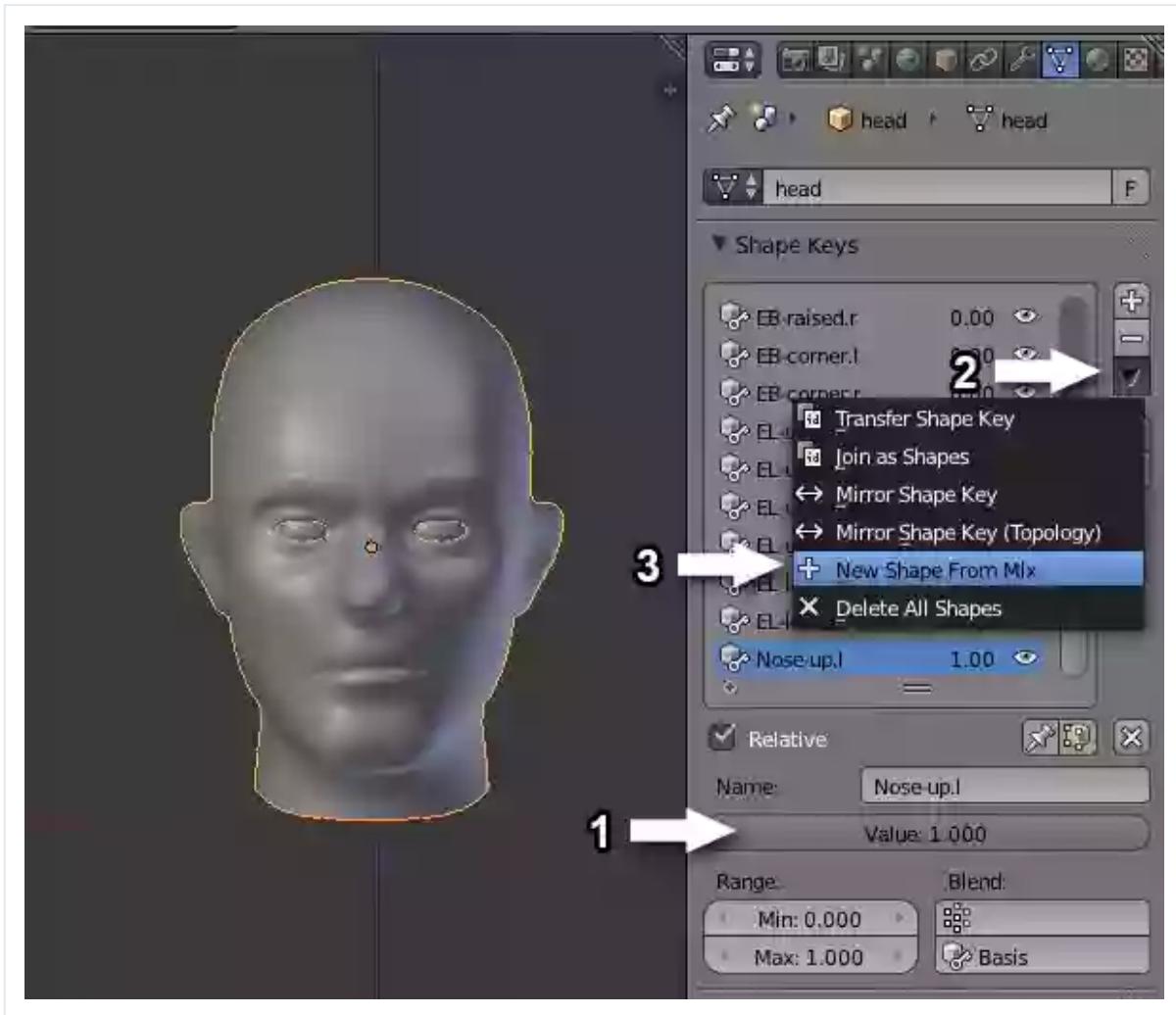
Step 36

Press **TAB** to edit the mesh. Select a few vertices around the nose and move them upwards.



Step 37

Press **TAB** to exit **Edit mode**. Duplicate this key to make one for the **left** and one for the **right** side. First increase the **Value** slider to **1.00** and then add a **New Shape From Mix**.



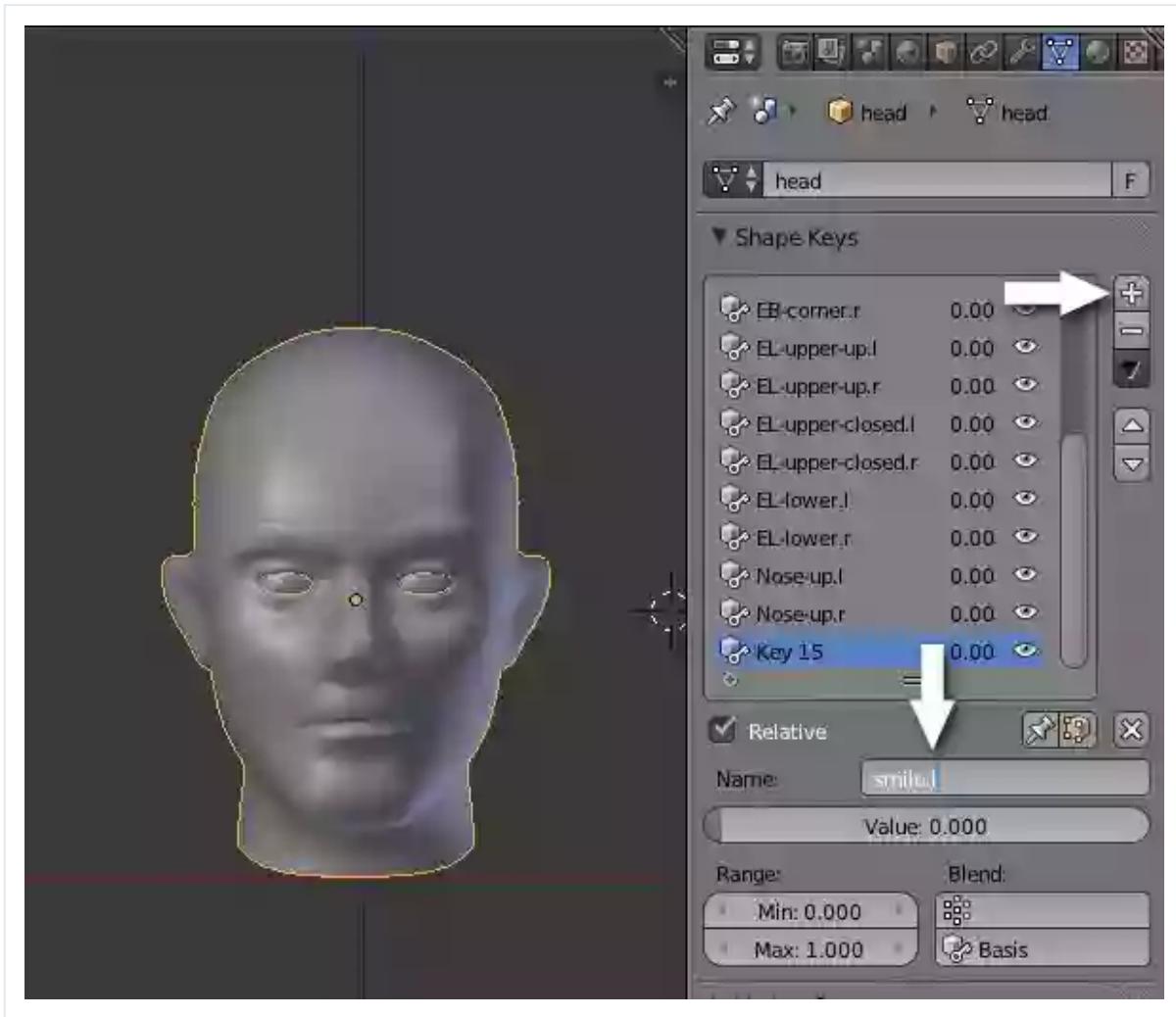
Step 38

Rename the new key **Nose-up.r** and assign the **Right** vertex group to it. Assign the **left** vertex group to **Nose-up.l**



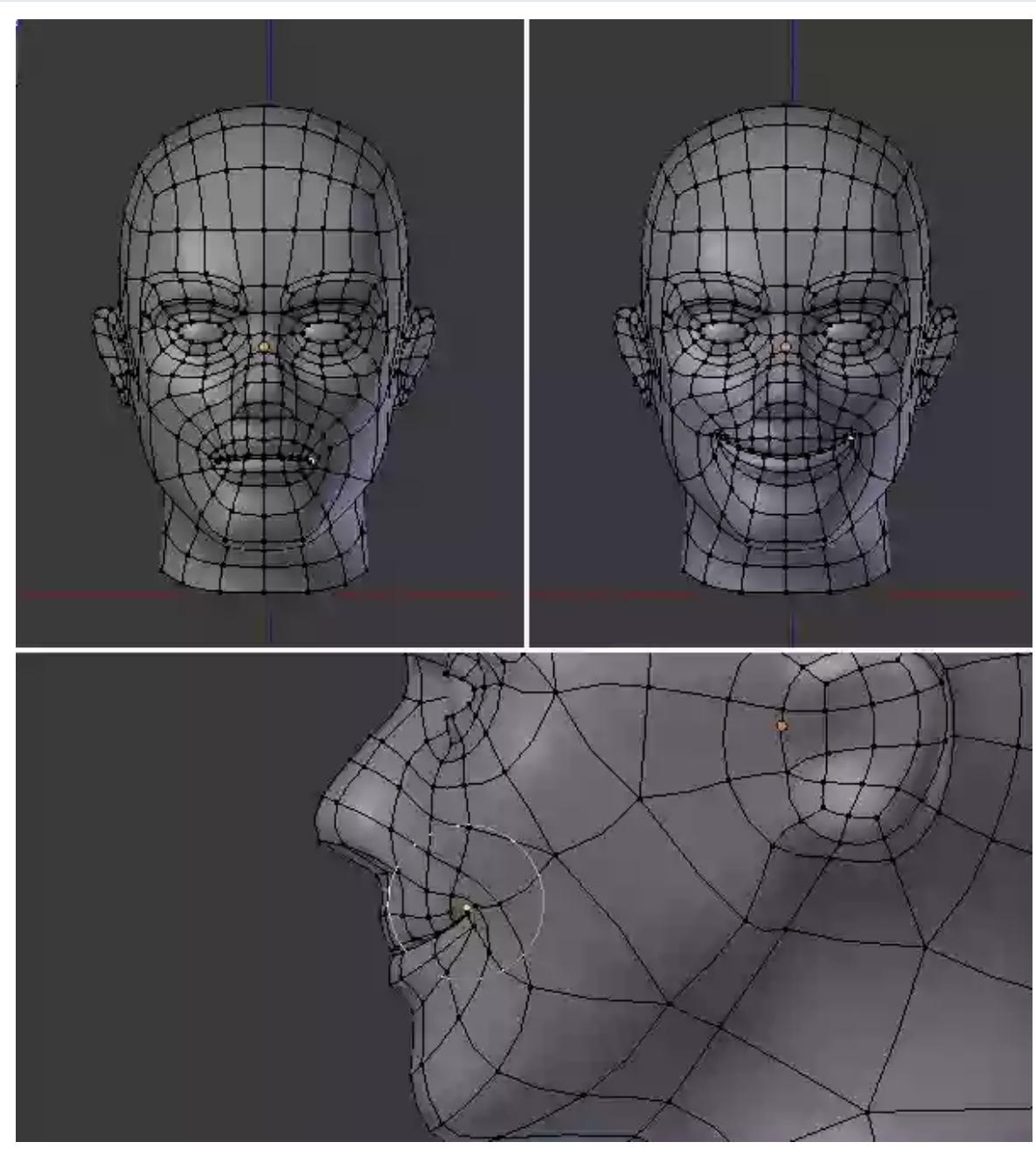
Step 39

Similarly, create another **Shape Key** for **Smile**.



Step 40

Press **TAB** and edit the mesh to get a good smile. I use soft selection to move the surrounding cheek muscles also. Remember to check the points from the side.



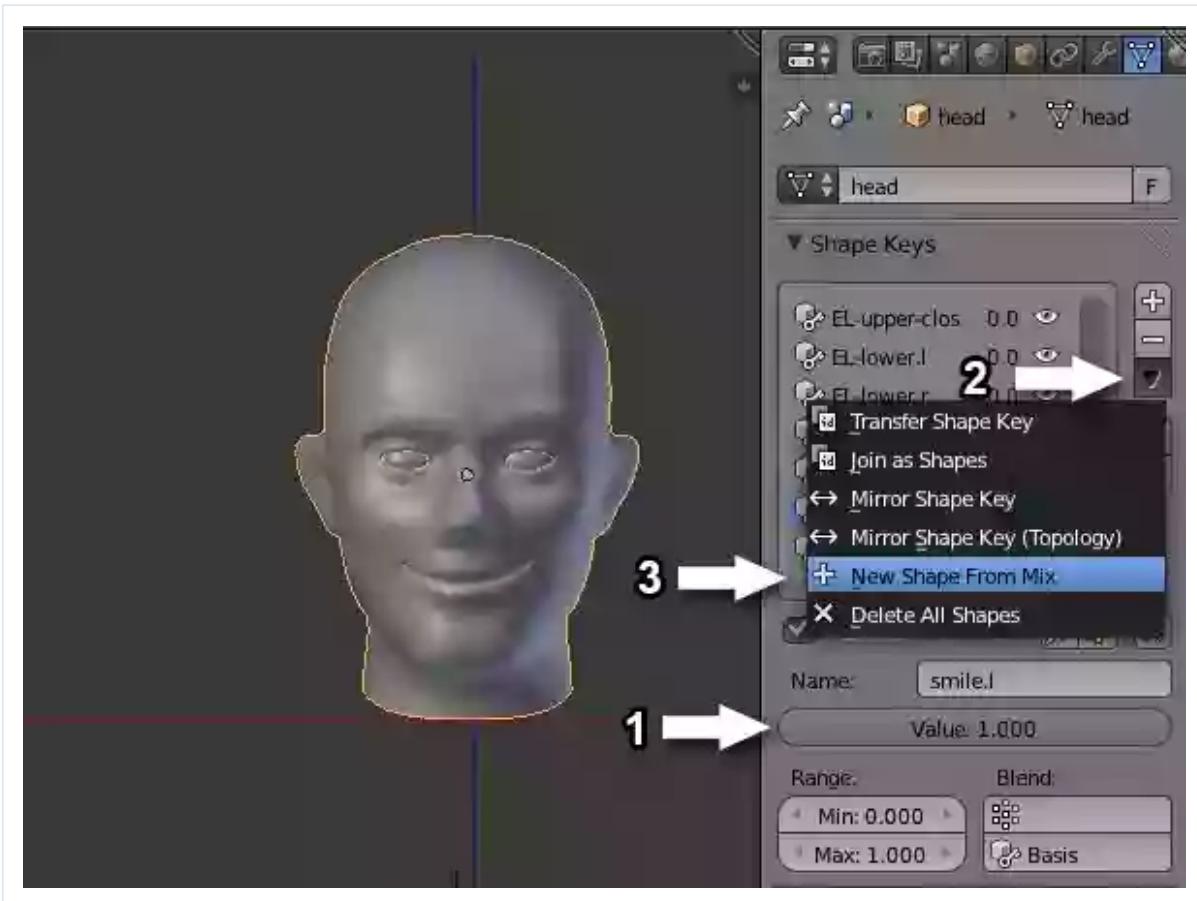
Step 41

By now you should know how to split the key into left and right.

Duplicate the key and assign one to the left and other to the right

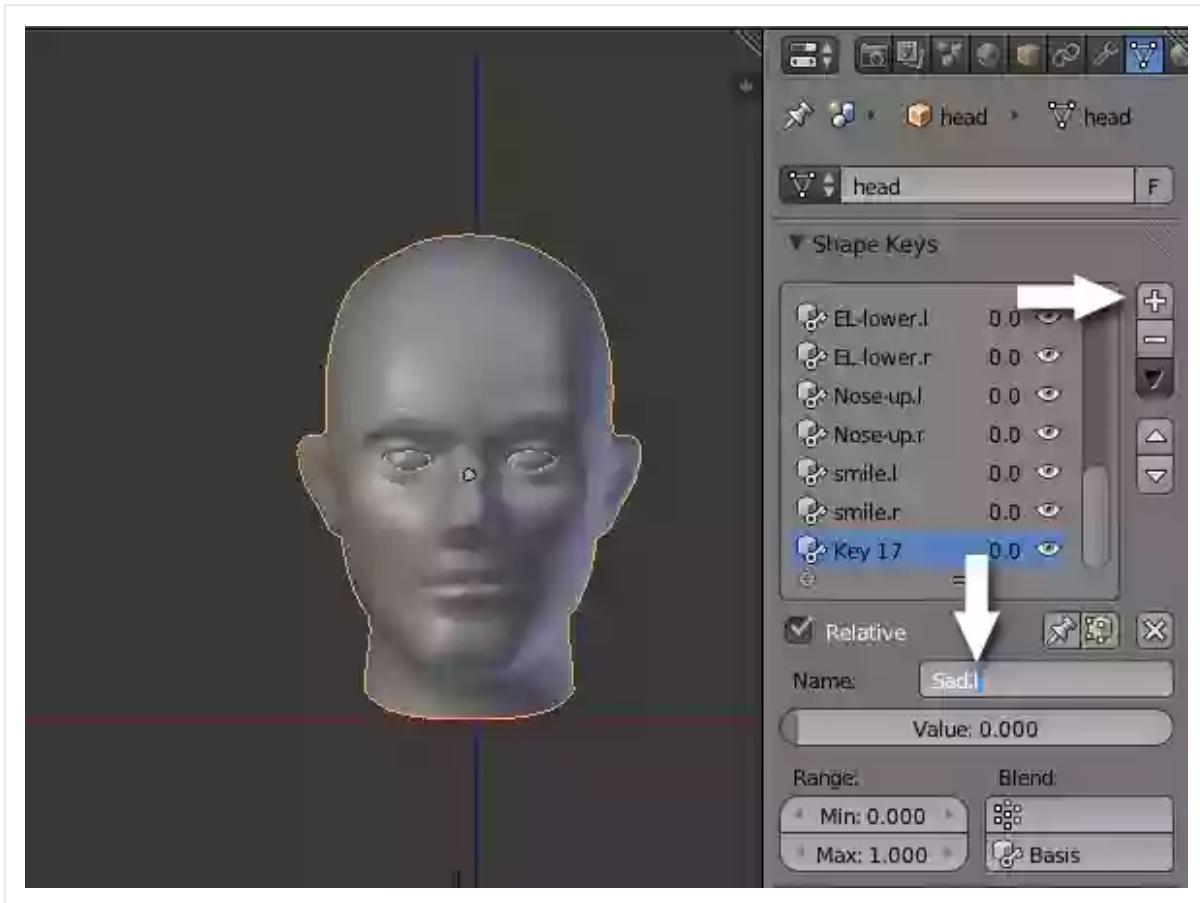
Duplicate the key and assign one to the left and other to the right

vertex group. Rename the keys as well.

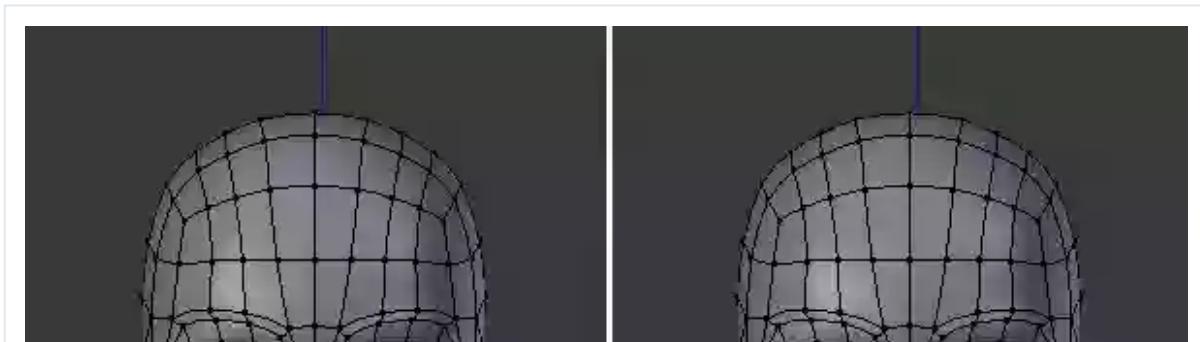


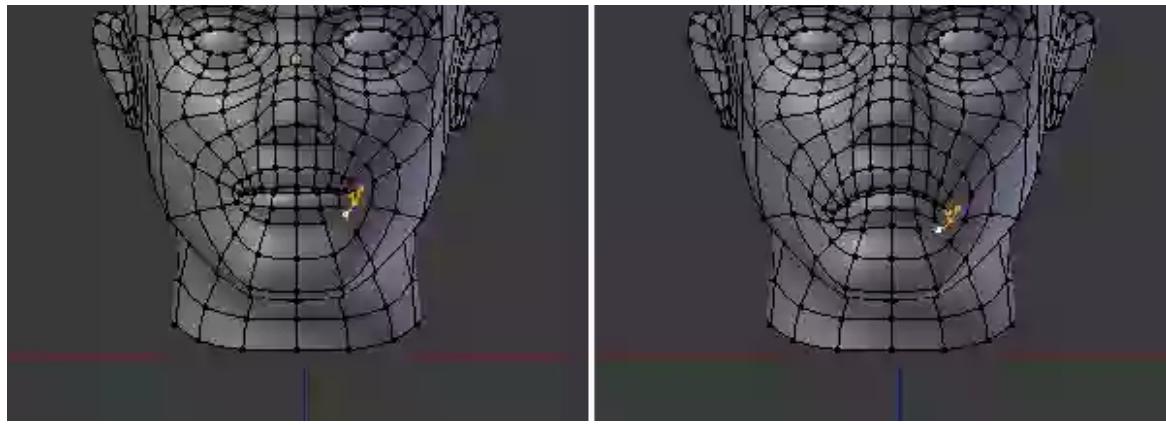
Step 42

Create a new **Shape Key** for Frown and name it **sad.l**.



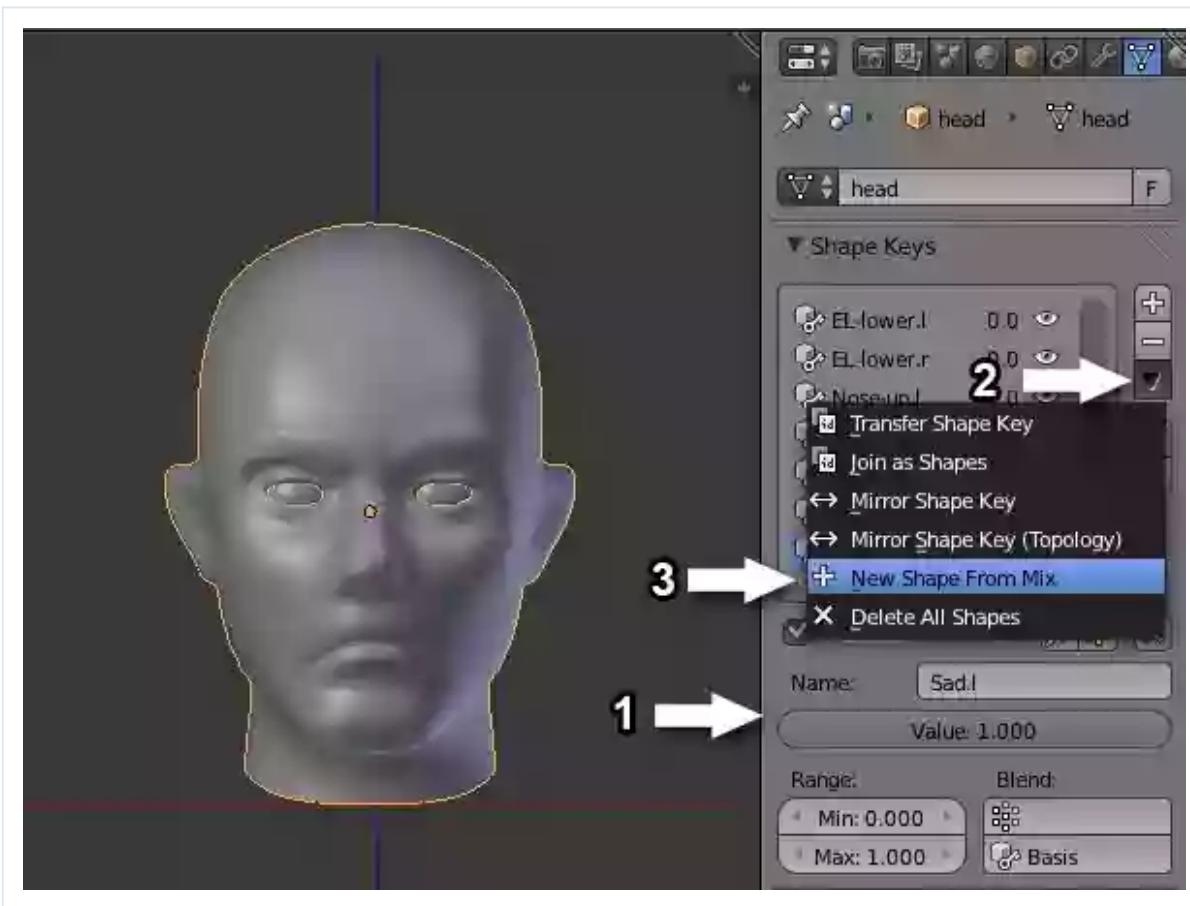
Press **TAB** to enter **Edit** mode and move the corner of the lips down. Also **Rotate** them a little bit. Use **Soft Selection** or the **Proportional** editing tool to help with this.





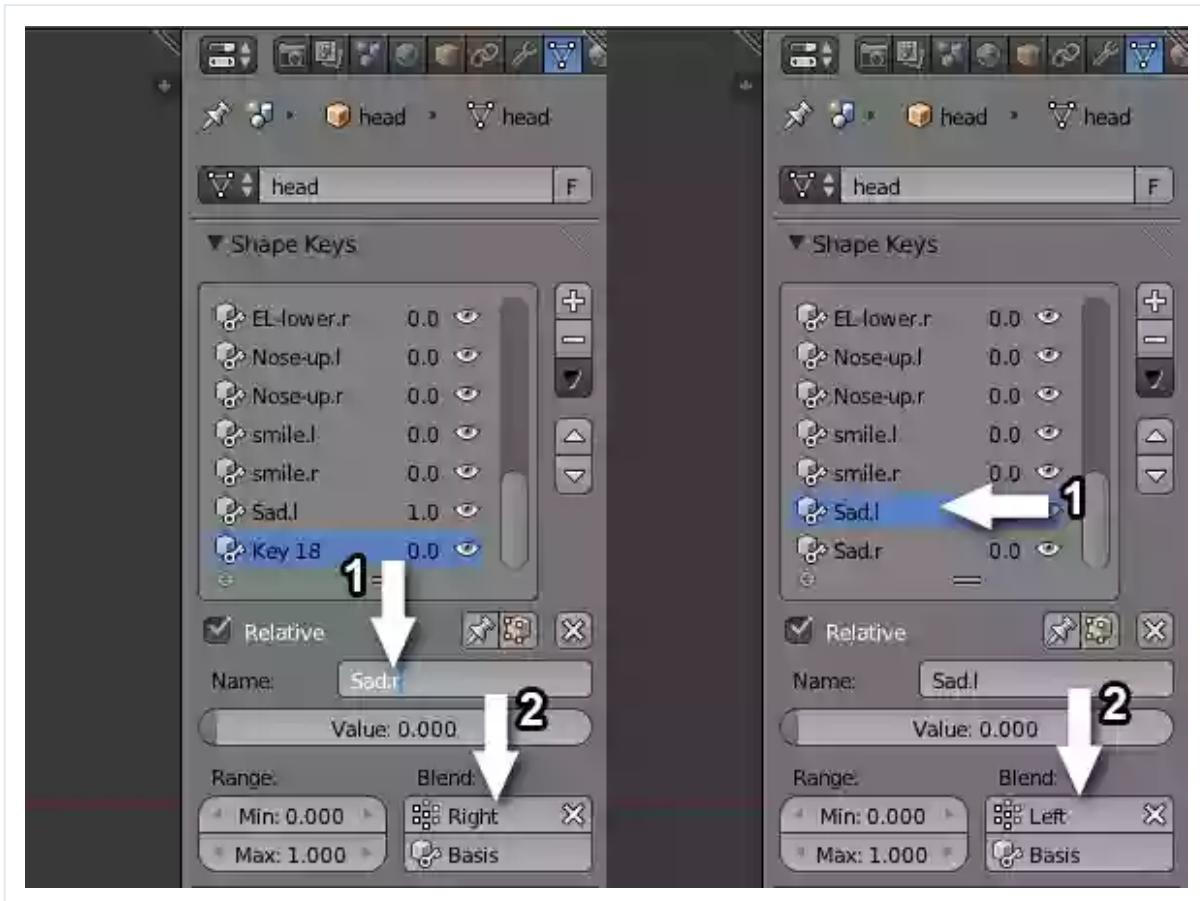
Step 43

Drag the **Value** slider to **1.00** and duplicate it (create **New Shape From Mix**).



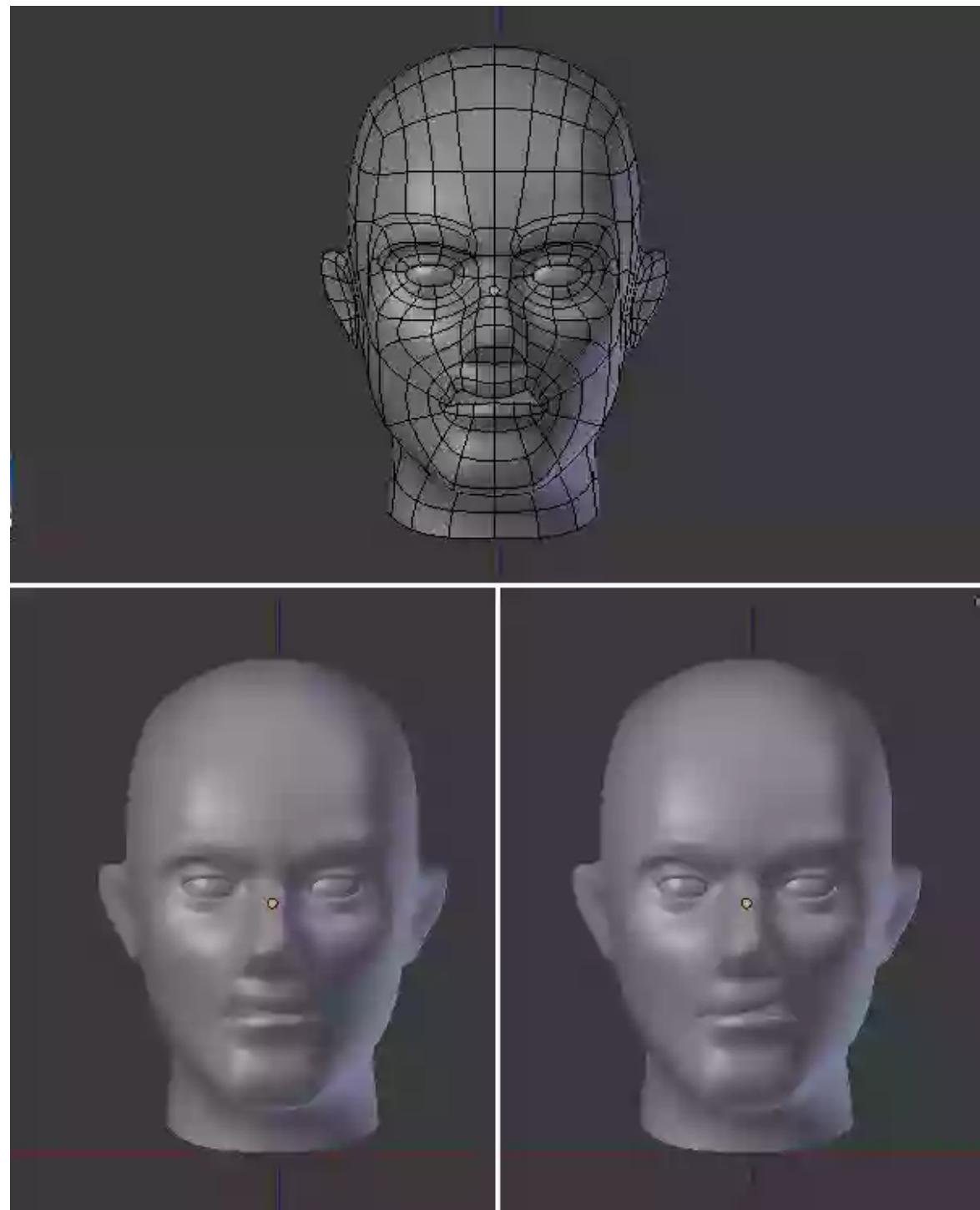
Step 44

Rename the new Key **sad.r** and assign the **Right** vertex group to it.
Also assign the **Left** vertex group to the **sad.l** shape key.



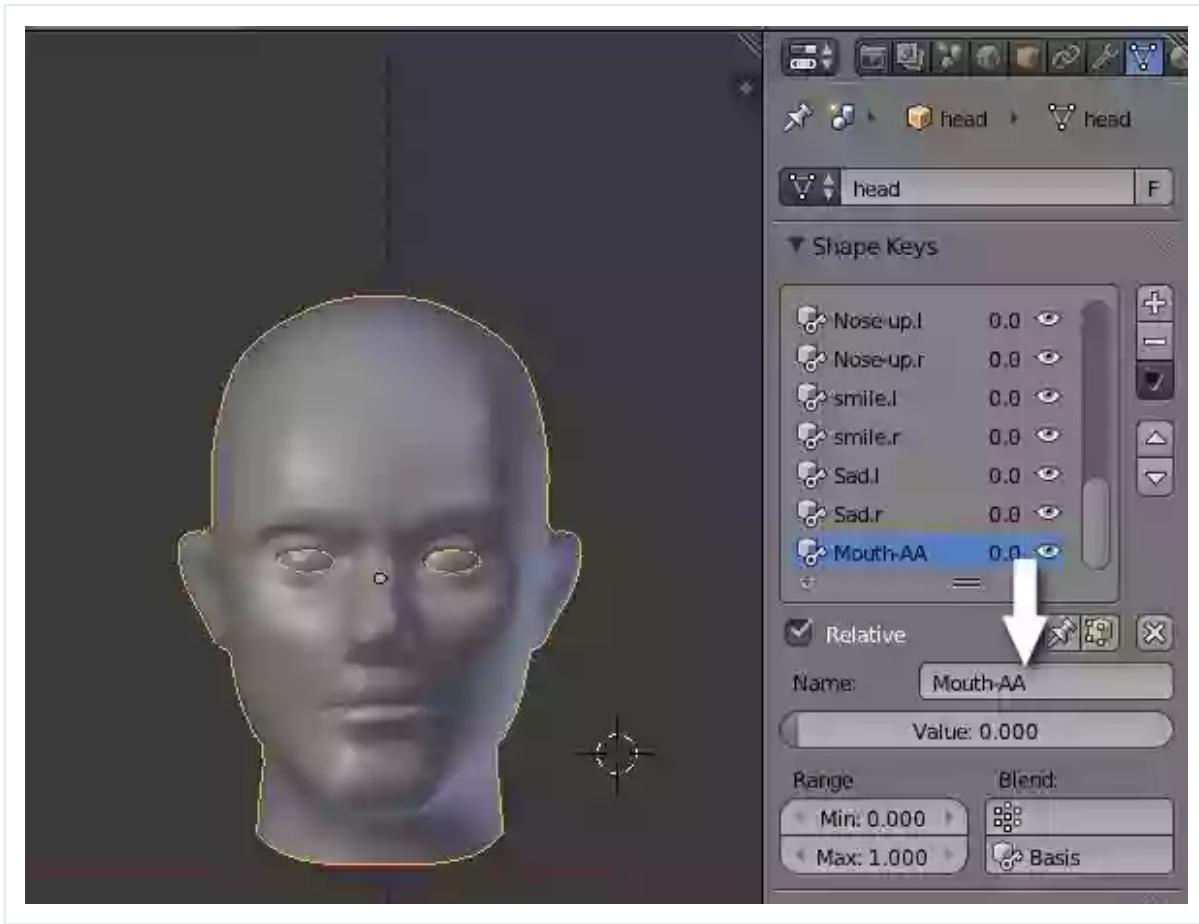
Step 45

Create a new **Shape Key** (by yourself!) with the upper lip deformed, as shown in the image. This one is to express a feeling of disgust or irritation. We need to split this one into left and right keys.



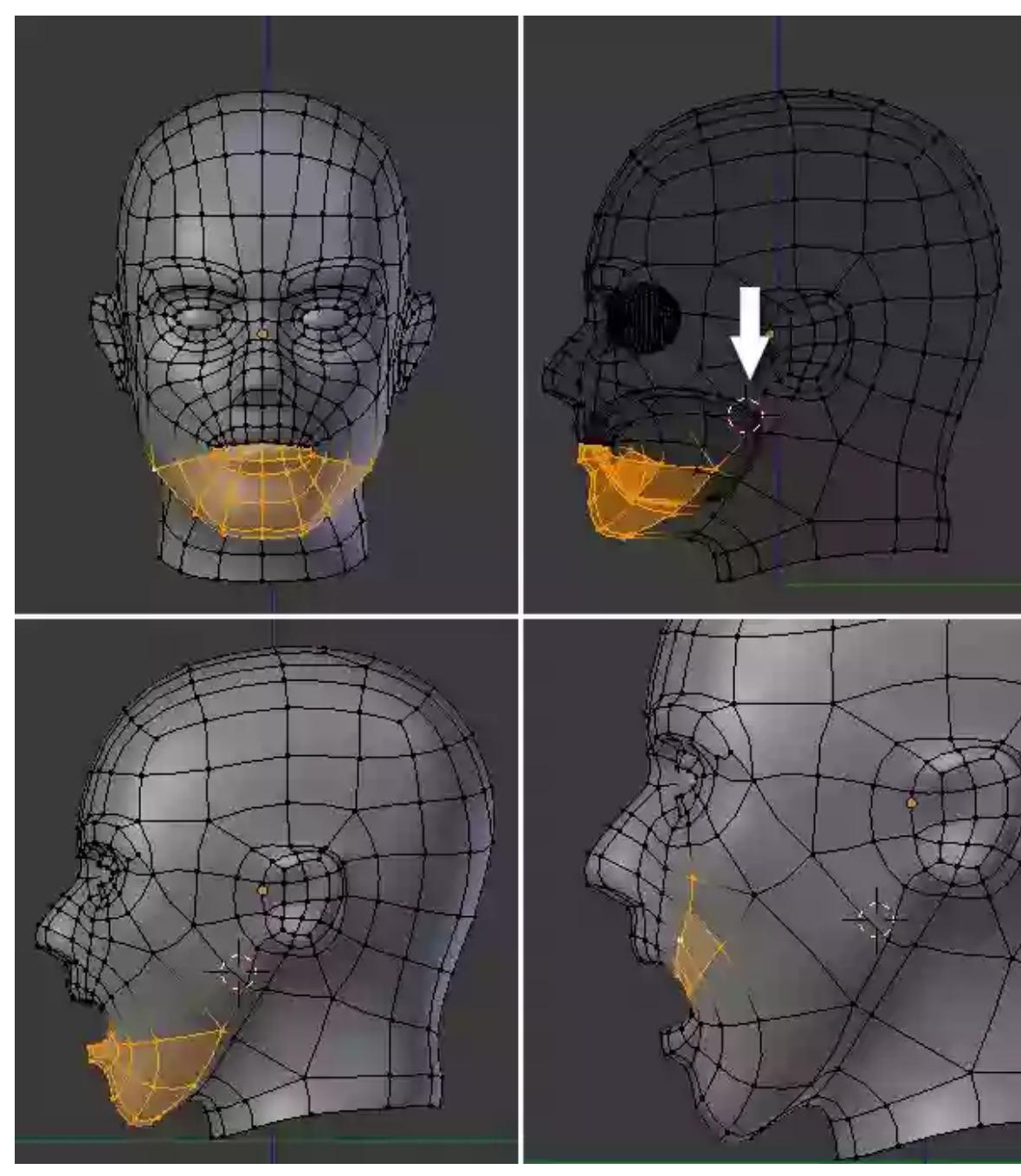
Step 46

Now we will create a new shape key of an open mouth. Click on the **+** (plus) sign and rename it **Mouth-AA**. We *don't* need to split this one into two for the left and right sides.

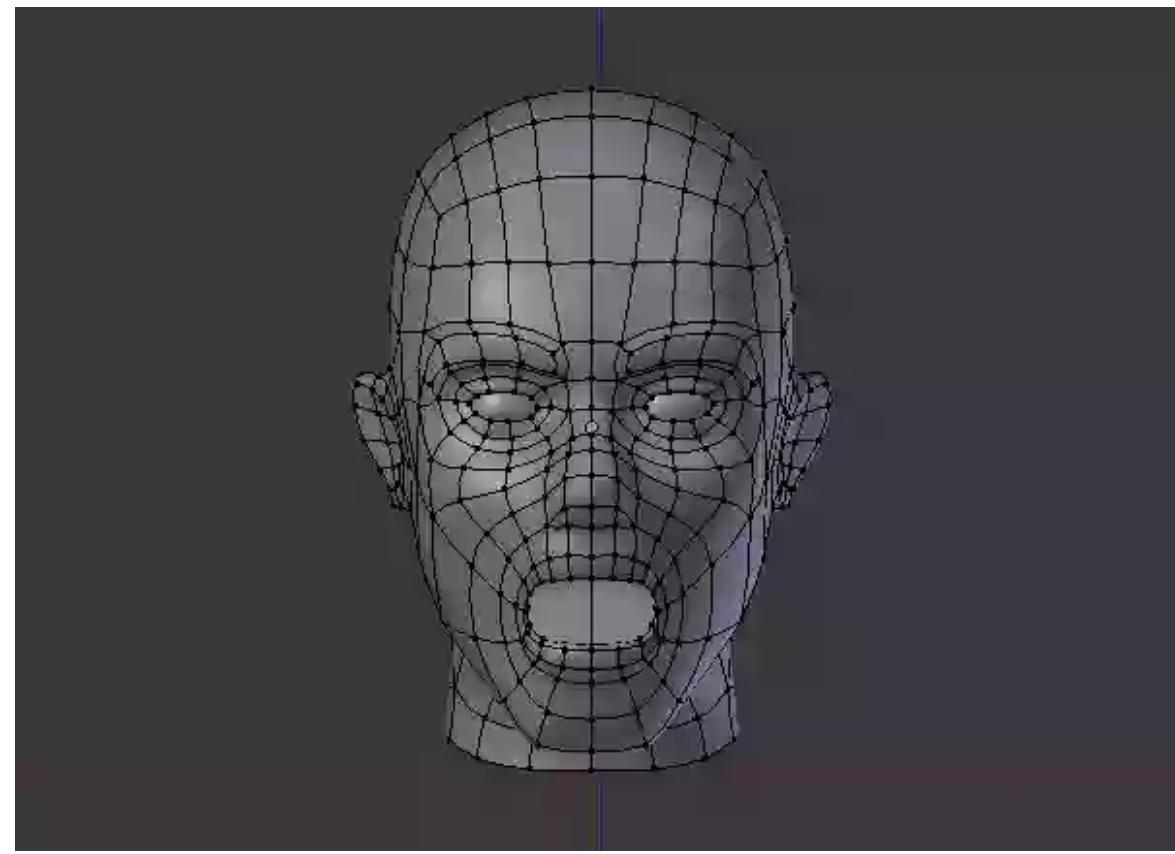


Step 47

Edit the mesh to make the mouth shape open, as if saying "Aaa...". Select the lower mouth vertices and the chin area. Also select the inside part of the mouth and the lower teeth (if your model has them). In the side view, **Left Click** on the **Jaw** joint to place the 3D cursor there. Press **.** (**period**) on the keyboard to make the 3D cursor the pivot center of rotation. Press **R** and **Rotate** the jaw to open the mouth. Adjust the remaining points. Press **,** (**comma**) to revert the pivot point back to **Box Center**.

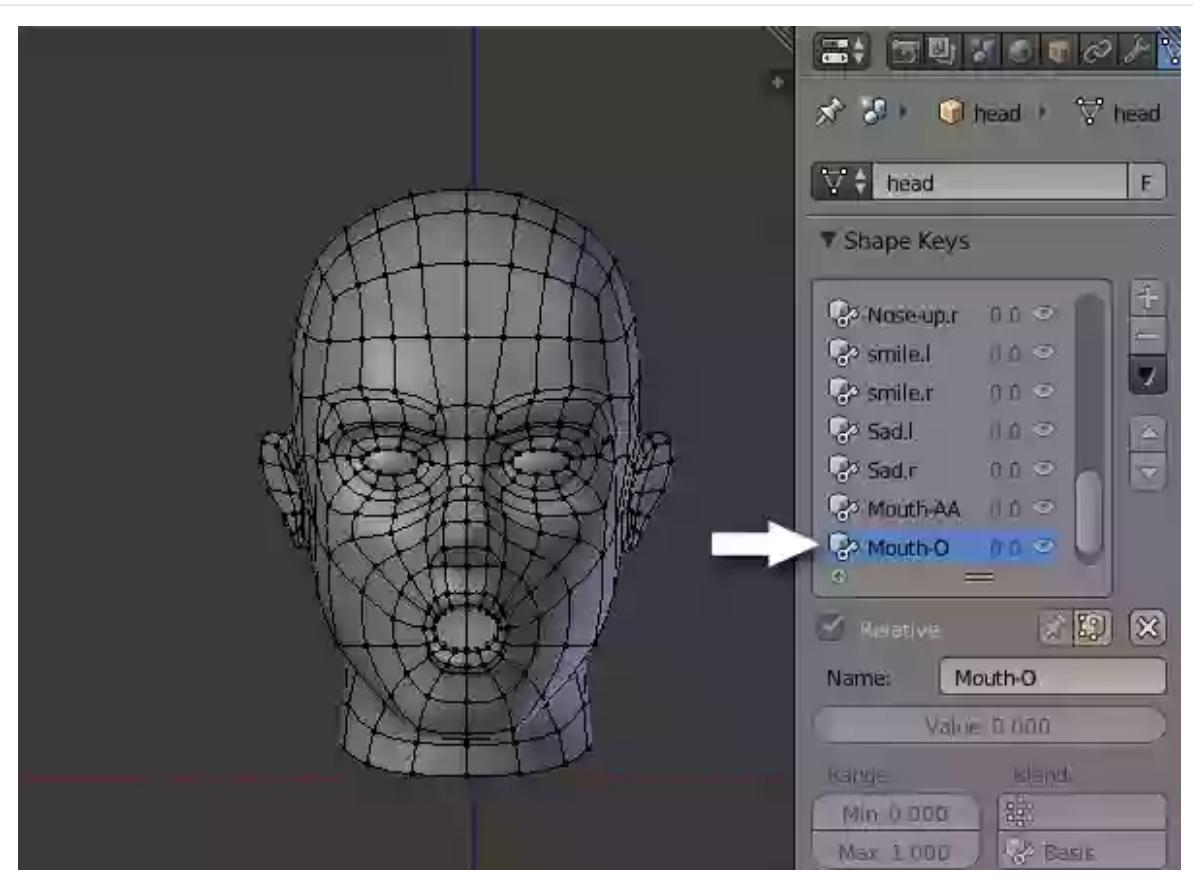


We *don't* need to make a duplicate to split this one for the left and right.



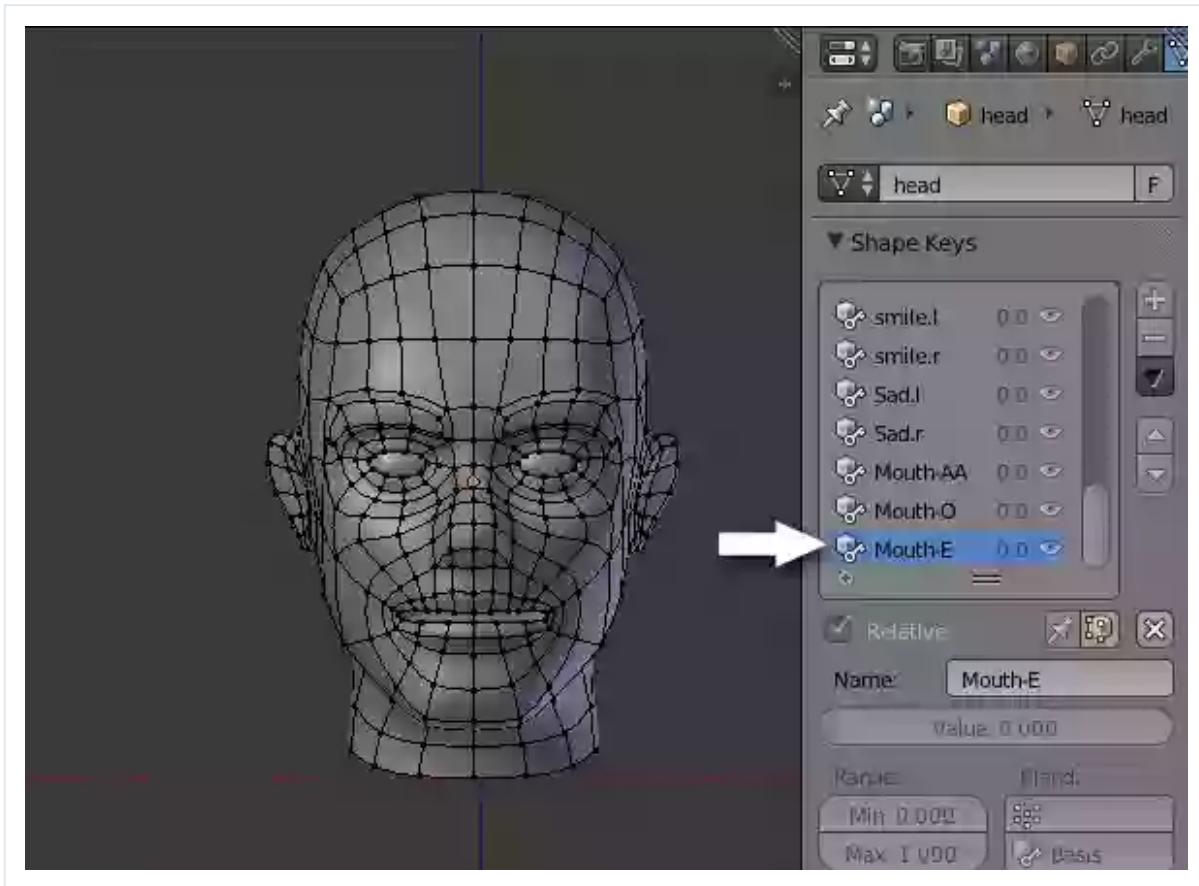
Step 48

Create another **Shape Key** for the mouth saying "O", name it **Mouth-O**. We *don't* need to split this for the left and right either.



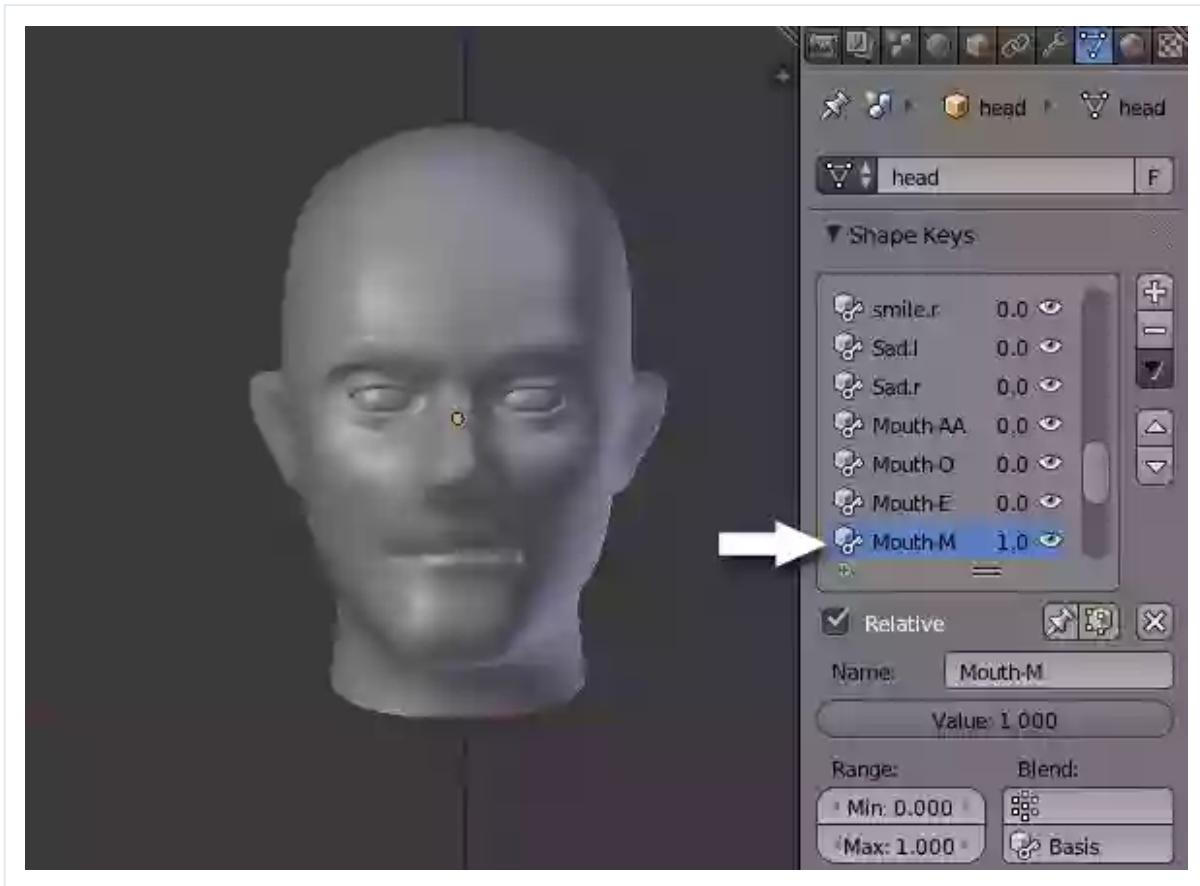
Step 49

Add another **Shape Key** for "EE", name it **Mouth-e** (again, we *don't* need to split this one.)



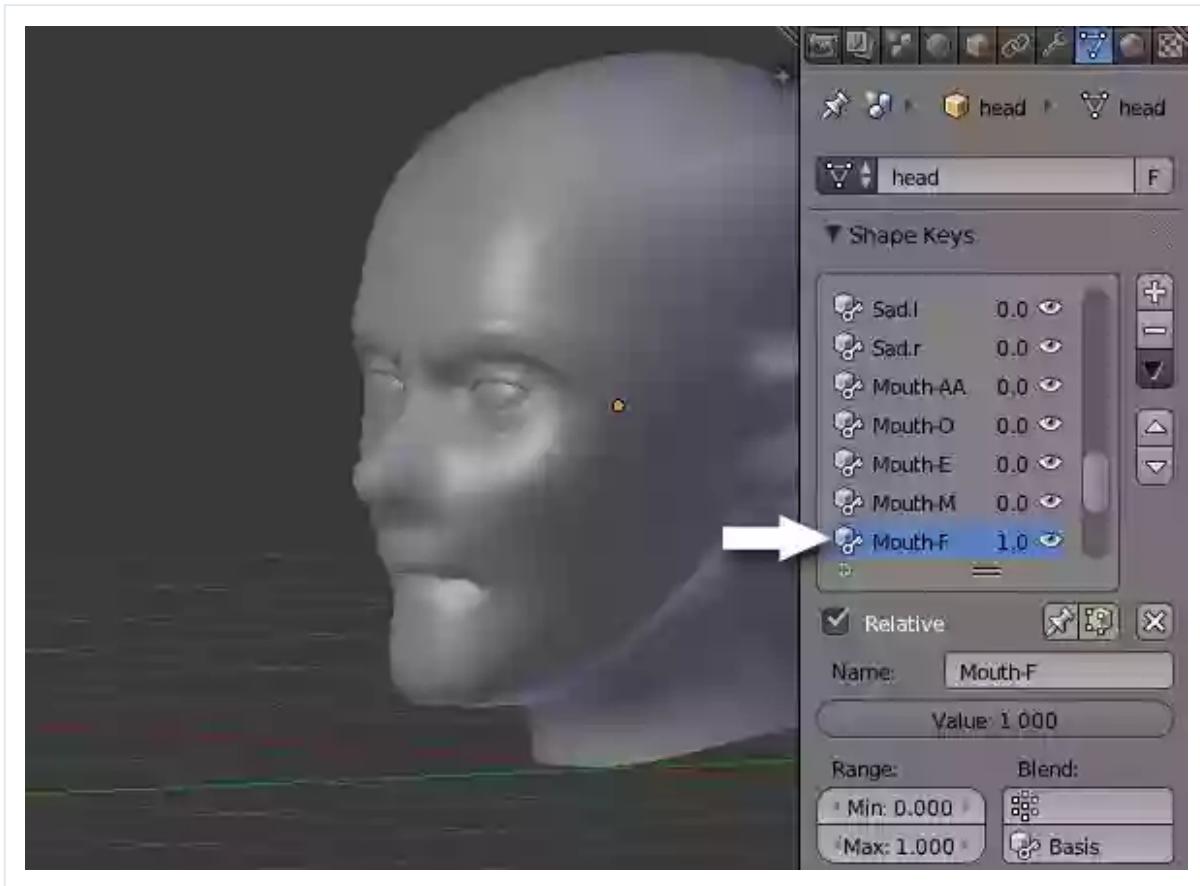
Step 50

Now create a new **Shape Key** for the "mm" (you can also create ones for the "b" and "p" sounds), and rename it **Mouth-M**. Model the lips in such a way that they appear to say "mm". Again, we *don't* need to split this for the left and right.



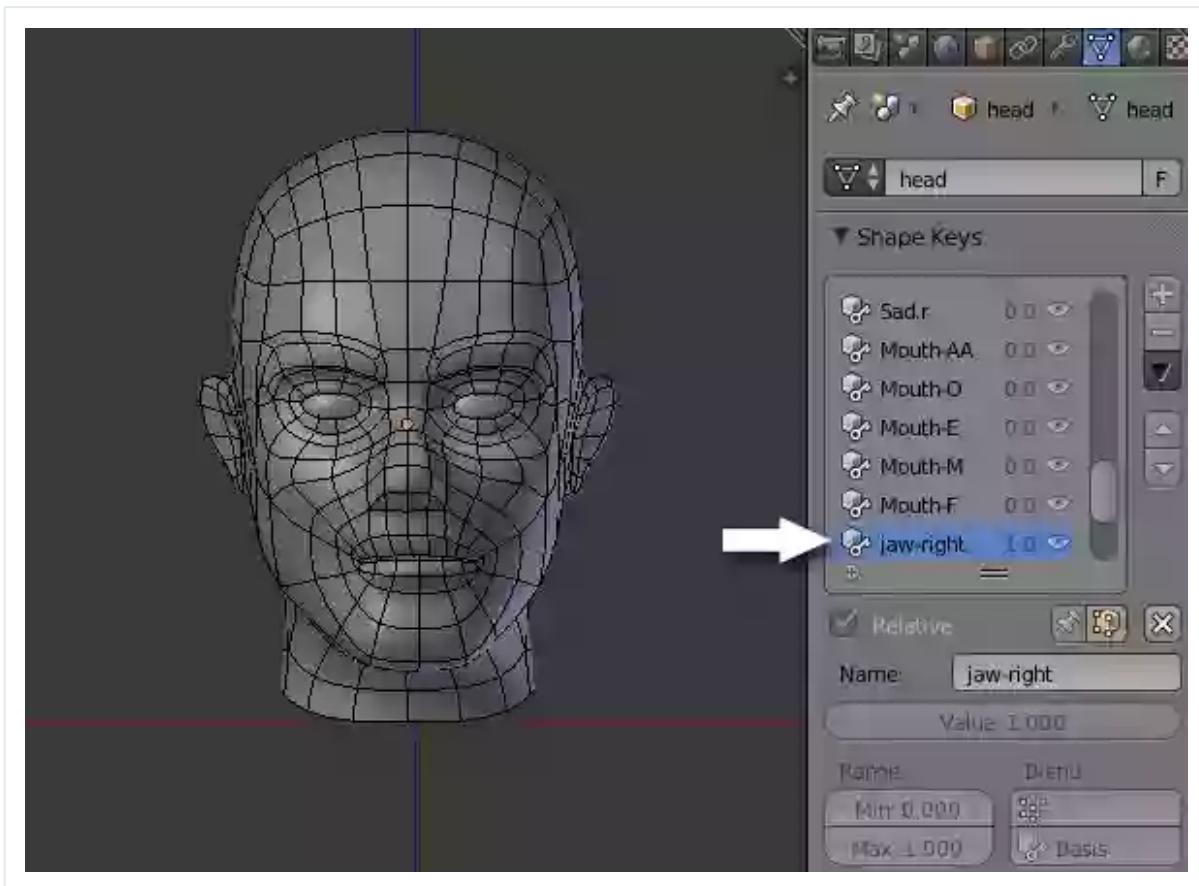
Step 51

Another common shape key is for "f" and "v".



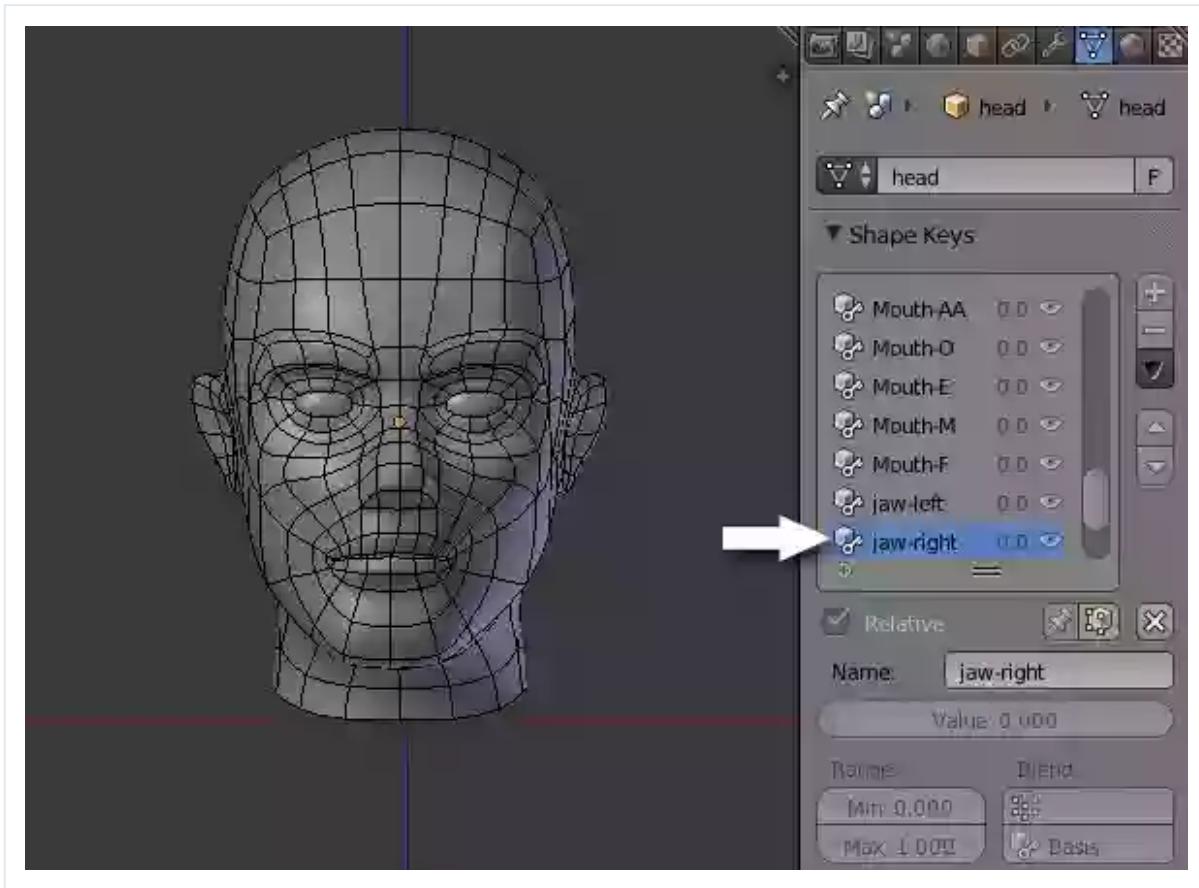
Step 52

Create a **Shape Key** for the jaw moving to the right, and rename it **Jaw-right**.



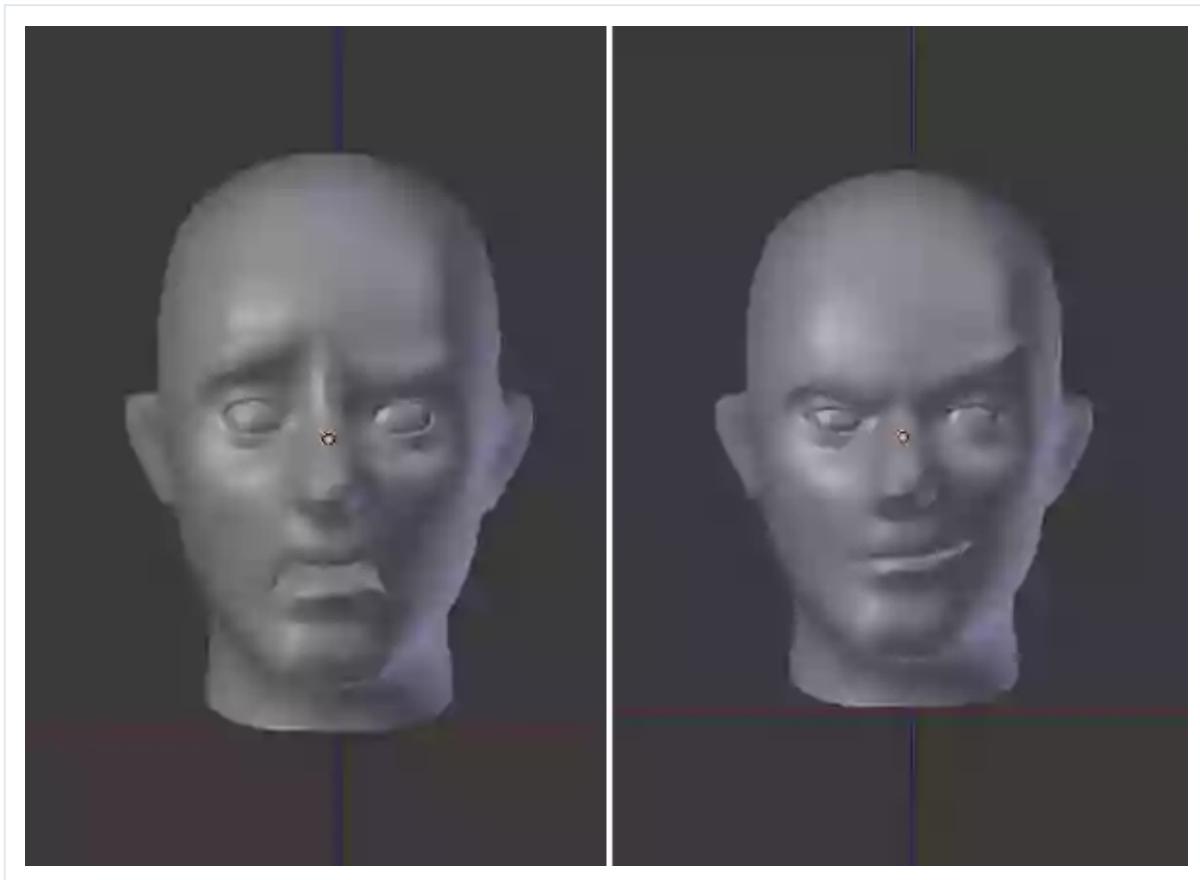
Step 53

Add another for the jaw moving left. Name it **Jaw-left**.



Conclusion

Now we have created most of the basic shape keys, which are a good starting point to learn facial animation. Play with a combination of different shape keys to create various expressions.



Feel free to explore and create more advance shape keys if you want, like a cheek puff, twisted mouth, mouth saying "u", etc. In the next part of the tutorial, we will learn to create drivers (bones) for them, which are easy to use when animating.



Karan Shah

Karan Shah is a 3D Artist and Animator from India. He is a BFA Graduate with specialization in sculpture. An inclination towards the digital medium made him a self taught computer artist. He is currently freelancing..

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- 2 ^ | ▼ Reply
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- 1 ^ | ▼ Reply
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- 1 ^ | ▼ Reply
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- Congratulations... now you're ready to go work at Dreamworks!
- [View](#)
- 1 ^ | ▼ Reply
-  **Amrita** → Jason Gormally
6 years ago edited
- Just 19 hours ago, this tutorial was launched and you have put your output at the same time ??? How so fast ???
- I have inquired about this author Karan Shah and researched his previous posts! He himself makes fake accounts and uploads the different output images in the name of different people. Why? Just to get fake popularity over his tutorials!
- He wants to show the world that lots of people read his tutorials, follow him and make their outputs and post as the comment!
- Ridiculous Karan Shah, get a life you Moron!
- ^ | ▼ Reply
-  **greg p** → Amrita
6 years ago
- you sir are a.....
- 1 ^ | ▼ Reply
-  **Amrita** → greg p
6 years ago
- Yes, you sir are an ASSHOLE!
- ^ | ▼ Reply
-  **Sherlock** → Amrita
6 years ago

It seems as though you are trying to replicate the ingenious methods of Sherlock Holmes. Your thinking is quite clever, truly, though you still do have much you need to work on. Your methods are flawed.

^ | v Reply



bwavo

4 years ago



Very first step: can not do it in Blender 2.76

It's asking me to add a Mirror modifier and Apply it.

I get an error: modifier cannot be applied to a mesh with shape keys

Uh... okay, I'm using the file you gave me.

^ | v Reply



Daniel Von Chaláán Bielčík

4 years ago



Hi please.. I need help with rig EYES... How to make CORNEA PUSH ??? Thank for answer :-)

^ | v Reply



Rod Davis → Daniel Von Chaláán Bielčík

4 years ago



All you would have to do is put shape keys on the eye mesh. Then set it up with drivers.

^ | v Reply



Margaret Toigo

4 years ago



Thank you for this -- and part 2 -- I learned a lot and I refer back to it often.

^ | v Reply



Catalin George Festila

4 years ago



most of this can not be include into Unity 3D with Blender 3D exporter scripts , just rendering and Blender game. If you can just send me one replay.

^ | v Reply



Gellato

5 years ago



is there any other way to prepare a character rigging without using shape keys? for facial rigging?

^ | v Reply



Rod Davis → Gellato

4 years ago



The Pitchboy Rigify works. Most games do not need the cheek puffs and such. You can get by with very little bones depending what your limits are. I've seen games only needing a jaw and corners of the mouth.

^ | v Reply



HOMAR OROZCO

6 years ago



thanks, very clear tutorial....

[^](#) | [v](#) [Reply](#)



greg p

6 years ago



Thank you for this great tutorial!

I'm sure many people (like me for example) will find this useful.

Keep up the good works!

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