

Porting sculpts for 7.0

By [Eme](#)

Hi and welcome to my guide for porting sculpts from pre-DT to be 7.0 compatible! This is written with a good general understanding of sculpting in mind and knowledge of the terminology involved, if you're brand new to sculpting I'd suggest checking my previous [guide](#) covering it from the beginning, there are also plenty of brilliant guides on Koneko's [website](#). The gifs are all full-size, so zoom in if you would like to see them better!

There will likely be better ways to do this along the line so I plan to update this as we learn more about 7.0. This is what I have found works for me so far, if you have any feedback feel free to contact me about it!

The main changes going into 7.0:

- 7.0 updates to the head model include an improved armature/rig, more face bones (especially around the eyes and mouth), better teeth as well as new textures and UVs.
- The UVs for a lot of the face textures are now similar to each other except for male/female hrothgar and elezen, this means UV/texture matching for makeups between faces and races will be a lot easier.
- The location of the Miqu'te ear flap has been moved to near the bottom of the neck, the beauty spot has been moved back to the etc_a/b texture unlike the benchmark where it was on the fac_a/b texture.
- The UVs for etc_a have been changed, nothing too drastic just the positioning of where the eyebrows and eyelashes are on the UV/texture has been adjusted to make the eyelashes bigger meaning they'll be a better quality. This will likely vary face to face with how different they are to the pre-7.0 UVs/textures.
- The issue where eyelashes/eyebrows etc. would be separated due to LOD has also been fixed, they instead come as one part.
- The faces now have additional textures, with the Benchmark faces having 5 parts. Here is a general explanation of the parts on Viera Face 3/103 for example and what textures they are tied to from the Benchmark head:

Part 0.0, 0.1 - Face and beauty spot (fac_a/b)

Part 1 - Face diamond (fac_a/b)

Part 2 - New eye orbs (iri_a)

Part 3 - Eye cover (etc_c)

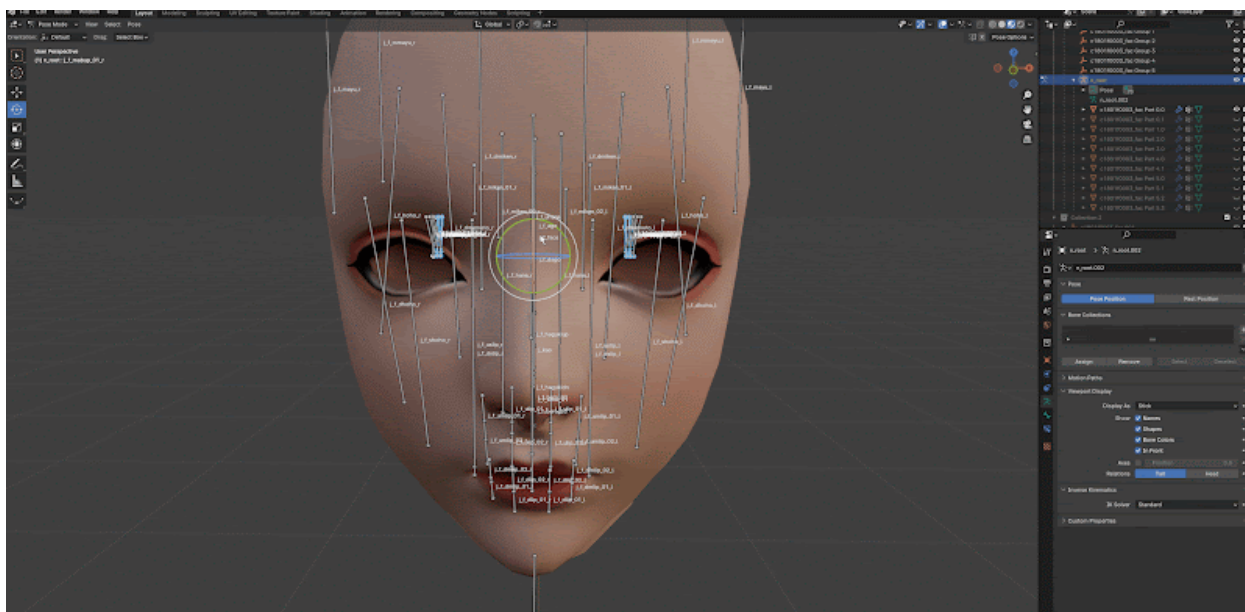
Part 4.0, 4.1 - Eyelashes, eyebrows and toggleable extra eyebrows (etc_a/b)

Part 5.0, 5.1, 5.2, 5.3 - Eyeshadows, tattoos, eyeliner (etc_a/b)

Understanding how the new bones work:

I thought it would be worth covering a bit about the new bones and how they work together. Unlike the pre-DT bones where one bone would do pretty much the whole

movement, such as the eyelid, now there is 3 bones that do this. When you want to move a whole section, such as the eyelid or the lower lip, you'll want to select all the bones tied to it to move them together as a whole part.



Additionally a lot of weights overlap each other slightly, so one section of the eye for example could be affected by 2 or 3 different bones and weights. It's important to keep this in mind if you do need to reweight the eyes as you might need to paint on multiple bone vertex groups to get the desired weights that you want. If the eyes have a changed shape you'll also want to manually adjust the weights for the eyelashes whilst the eyes are slightly closed to check how they move with the eyelid.

Before going into Dawntrail I'd suggest taking a look around how the new bones work and the way the weights align with the bones. Currently testing weights is trickier without emote options, although it's worth trying out the weights now if you can and have time to so they're easier to work from on launch, generally I think weights will be much smoother to fix once 7.0 launches and TexTools/Penumbra are available. For now, it's probably better to prioritise getting textures 7.0 ready as I doubt the UVs would change from this (hopefully I won't eat my words with that, I don't know why they would re-UV it again), but there is a chance weights may end up slightly changing if any head models get adjusted in some way before launch.

What I have found from 7.0 so far:

As I have done a bit more testing in the live version of the game, I wanted to cover a bit about what I've felt is easier going forward compared to what worked in the benchmark.

- I would recommend working off the DT faces as a base and not the benchmark versions, I'm not sure if it was something I did with the weights in the benchmark but I have found the 7.0 head weights are so much easier to work from and tend to have a lot less issues in comparison.

- Thank you to Vivi for mentioning this in her server, but there seems to be some strains when changing the mouth to no longer be a straight line. This tends to cause issues with the weights which unfortunately will mean individuality in mouth shape is more restricted. There may be a way around this but I have found keeping the mouth line straight helps a lot with the weights even when changing the main mouth shape.
- For public and paid sculptors I would recommend remaking the sculpt from scratch if possible, it'll be a bit more work however making all the textures universal and making use of the new models/maps I have found is worth it. Plus it futureproofs your sculpt so you don't feel like you need to go back to re-update it again! Though there is nothing wrong with porting EW heads into DT, I've found the newer weights on sculpts that look a lot different to the original face do seem to cause quite a few issues with the new bones as well as it being limited to pre-7.0 makeups.
- With updated sculpts, as long as you're starting from scratch in the Penumbra testing version, seem to work well and haven't caused any crashes yet. However I am packing everything from TexTools with all the new 7.0 files and textures so I can't say if it also works for EW to DT ported sculpts.

Guide start and what you'll need:

In this guide I'll be using Viera Face 3 to work from, however, I expect this will work with every face as long as you're pulling from the matching new base head from 7.0.

Thank you so much to all the developers for making it possible to test mods within the benchmark!

- Blender
- Your old sculpt and the new 7.0 head (same race/face as the base head the sculpt was made from)
- [xNormal software](#) (If using Method 2)
- TexTools ([Benchmark Edition](#) - Can be found in the TexTools discord server)
- Any material editing tools (i.e. Clip Studio Paint, Photoshop, Substance etc.)

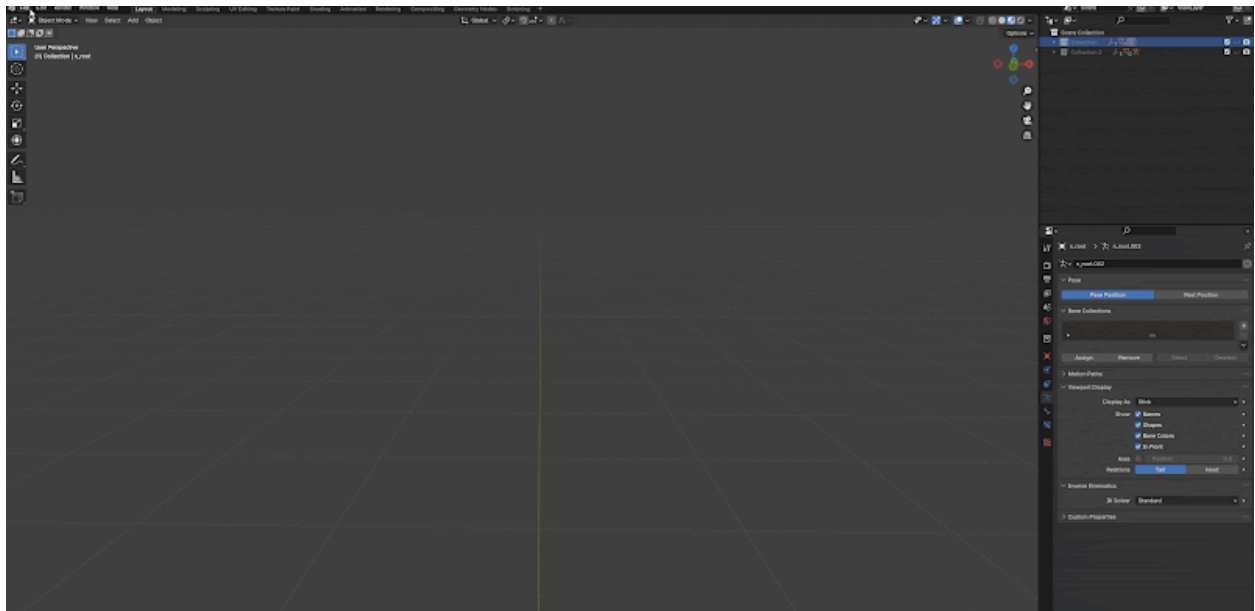
There are two ways to do this from what I have tried so far and the option varies depending on how different the sculpt is to the vanilla face. Method 1 will cover weight transferring from the new 7.0 face to your current sculpt, I'd suggest giving this a try first to see if it works for you, if not then you can move on to method 2.

Apologies in advance as this guide is pretty text-heavy, so hopefully the GIFs help a little bit to explain what I mean! Please let me know if anything is confusing or could be explained better.

As a note before going into the first method of the guide, I'm currently testing out how the new textures work. Generally, it's easier to use method 2 if you don't want to worry about re-updating to all the new textures, however it may be that textures that do not work currently in the Benchmark may have their old legacy files available which will work going into Dawntrail. I won't cover anything texture-specific for now as a few things seem odd so far from the benchmark (i.e. the eyelash/eyebrow normals seem to have its blue colour channel stripped or inverted) but I will look into it more on release.

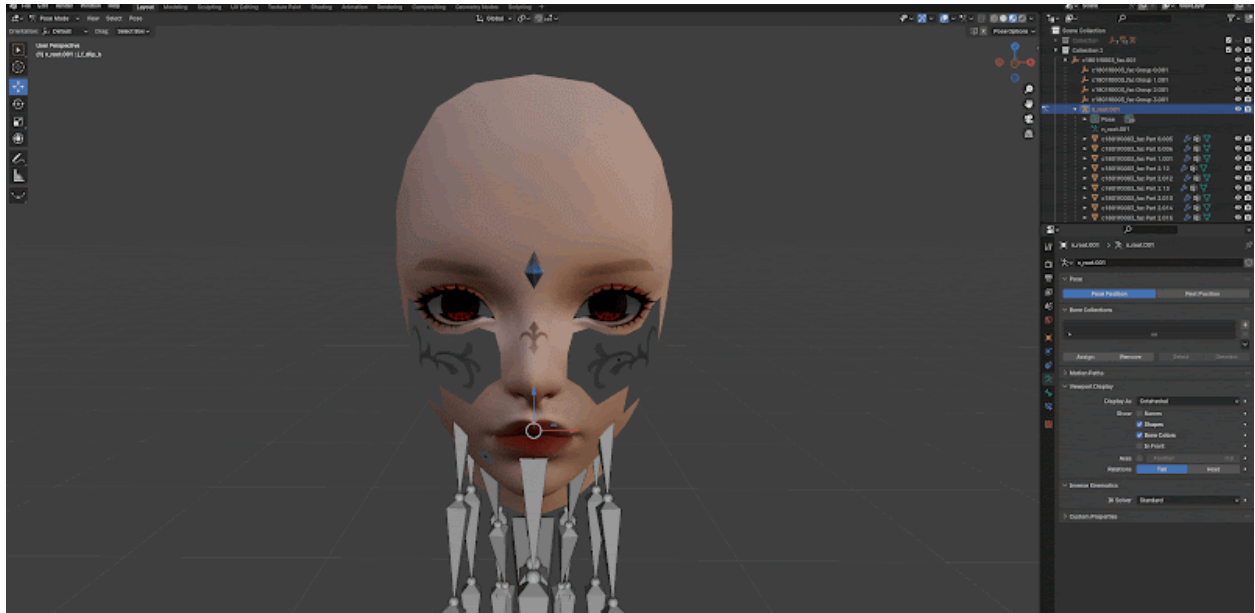
Method 1 - Old sculpt to 7.0:

To begin with, take the same base face as what your sculpt is from. I'd suggest making two collections in Blender and importing the new 7.0 head into one collection, and your current sculpt into the other collection. All of the 7.0 Pre-Dawntrail heads can be found [here](#), thank you to Sundown for the files!

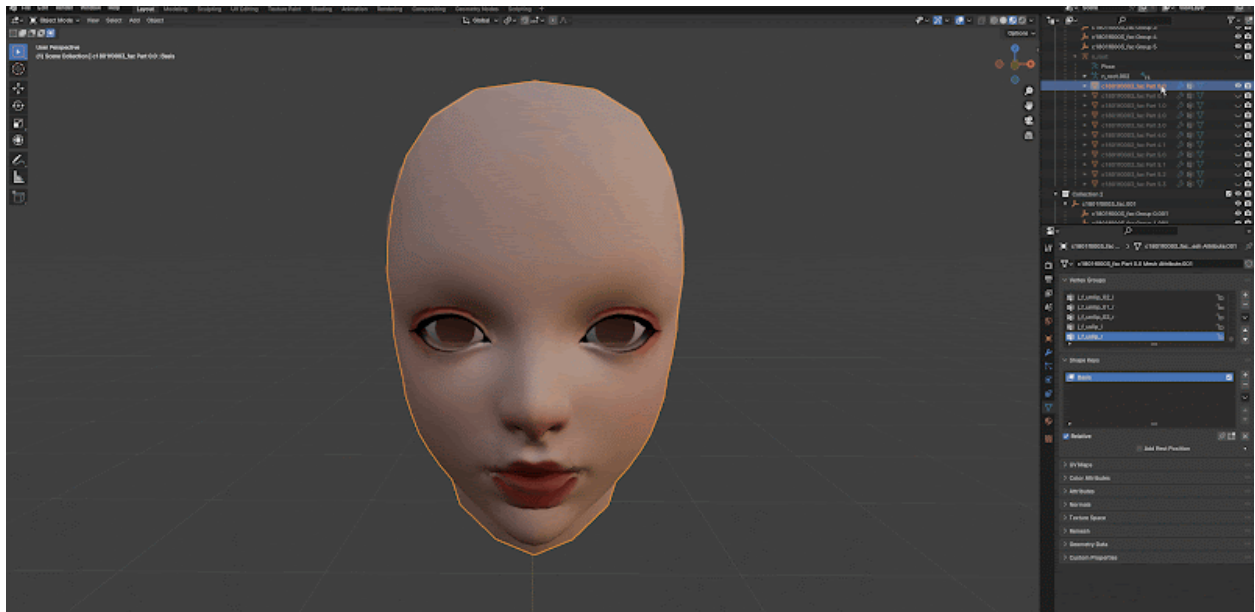


Next, you'll want to hide whatever you do not need for now on both the 7.0 model and your sculpt - this can be done by selecting what you want to hide and pressing *H*, to start with we'll work from the face. Before doing anything with the weight transfers it might help to change some of the posing of the face such as opening the mouth to make it easier to adjust the weights (such as if a bone weight has transferred onto part

of the top lip when it is meant to be only on the bottom)

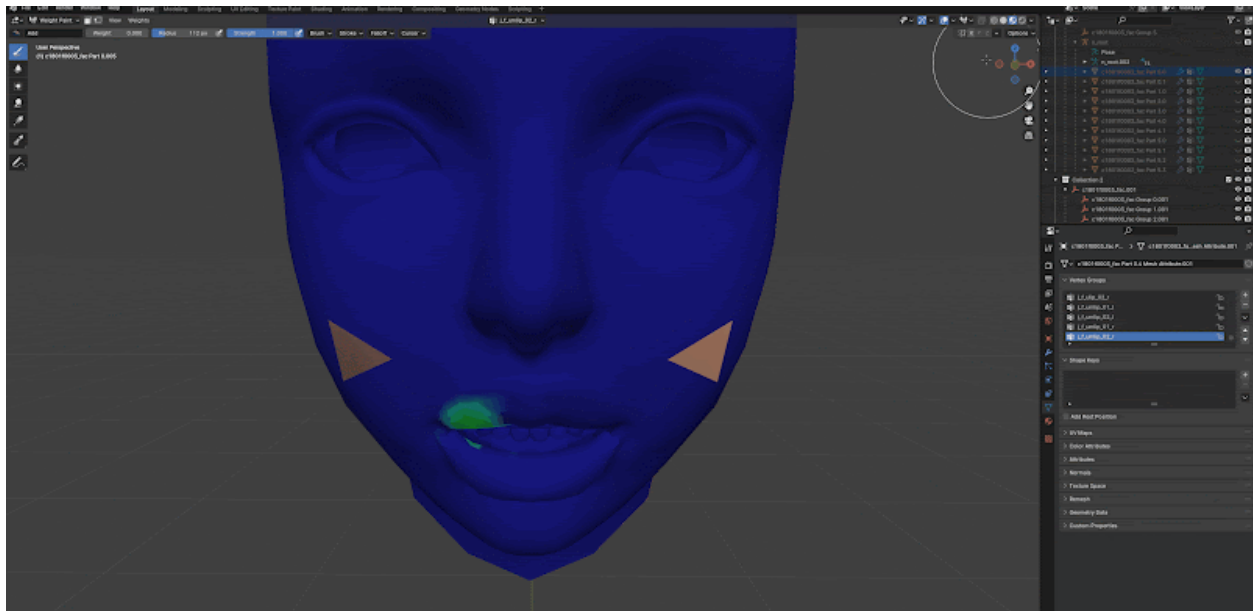


Select the new 7.0 head and your sculpt head, then in the drop down menu where *Object Mode* is select *Weight Paint*, after this go to the *Weights* tab and press *Transfer Weights*. Now you will have all the weights from the new face on your current face.

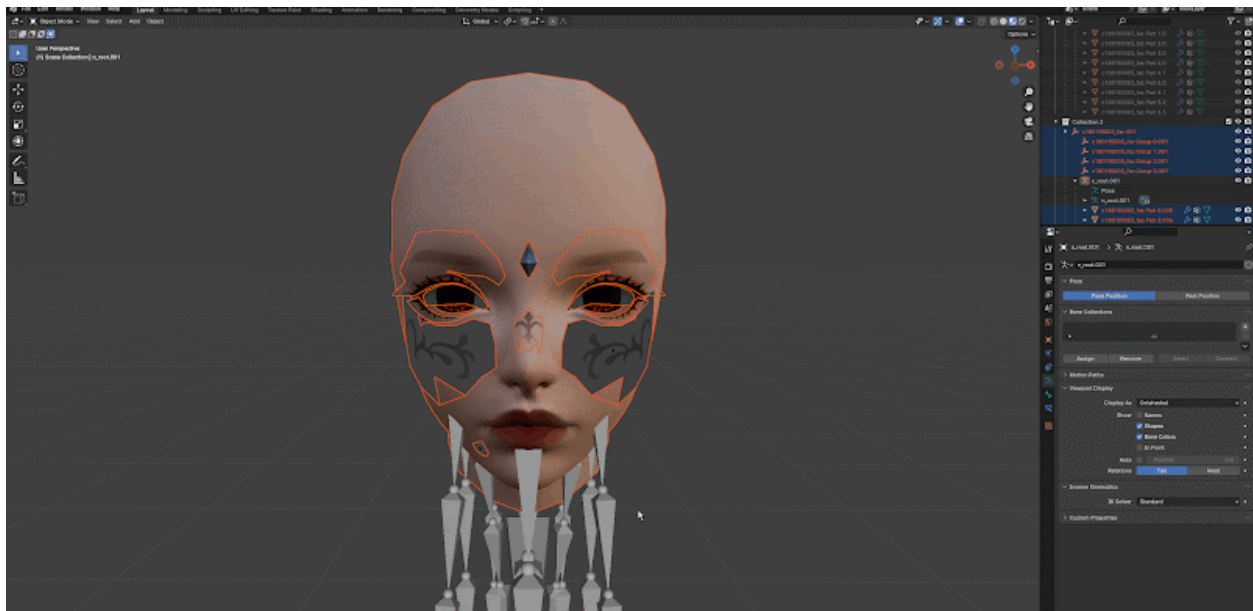


We now want to take a look at the weights as some may not transfer over correctly, for example, a part that is meant to only be on the top lip might have transferred onto the bottom lip as well. If you would like a better understanding of the new face bones I'd recommend checking out Mallow's [spreadsheet](#)! Additionally, if you are unsure on what weights mean and how they work I've covered in more detail an explanation of weights

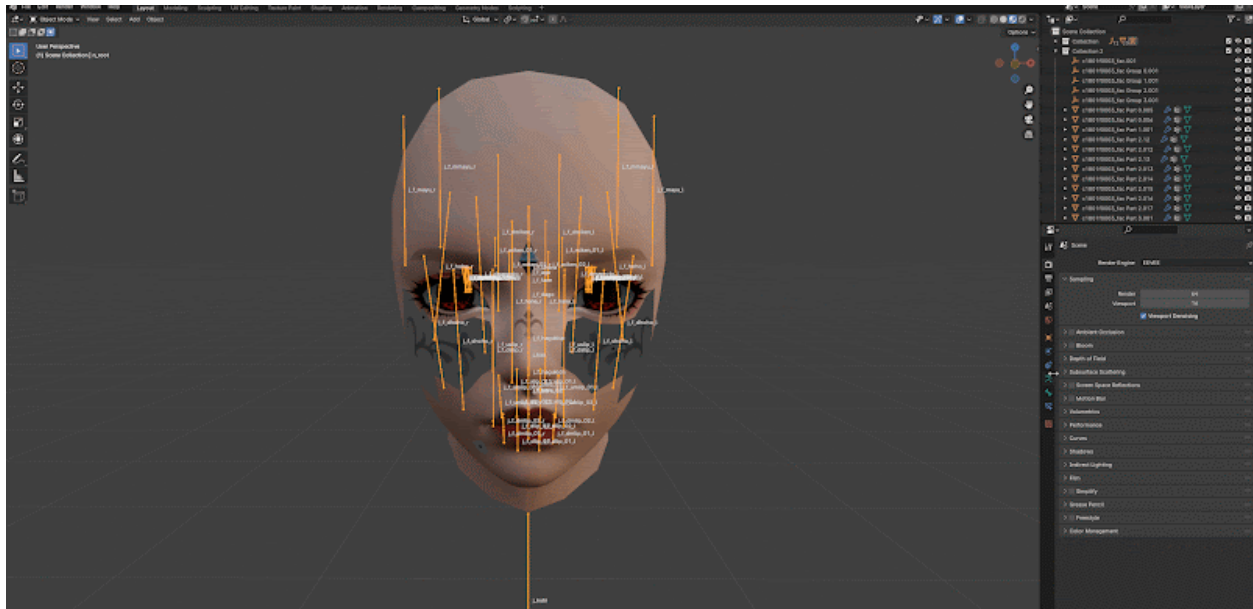
in my sculpt [guide](#) in the 'Now we weight' section.



Once you have adjusted any noticeable issues in the weights, you'll want to parent the new armature/n_root from the 7.0 model to your sculpt. Firstly, unhide all of the parts of your current head and select all by pressing A, then right-click on your model and go down to the *Parent* option and select the *Clear and Keep Transformation* button in that drop-down menu - you can now delete your old armature/n_root, repeat this with the 7.0 head but don't delete the armature/n_root or any parts of the head - just hide them. Next, select everything again from your current head, select the new armature last, right-click and go down to the *Parent* option and select the *Armature Deform* button. Now the 7.0 armature/n_root is connected to your sculpt so you can test out posing.

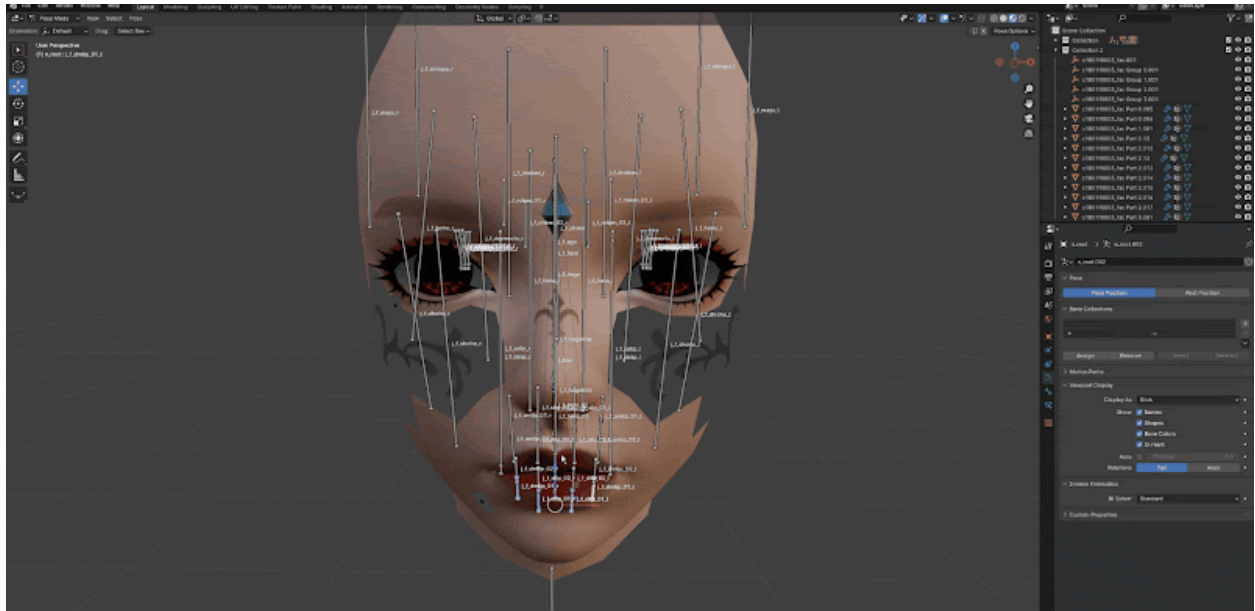


I'd suggest adjusting the viewport display for the new bones as well. With your armature selected, go to the little jumping armature icon in the bottom right sidebar called *Data* and click on *Viewport Display*. From here, use the drop-down menu *Display As* to change how the bones look, I've found *Stick* works well for me, then tick on *In Front* to make the bones easier to see.



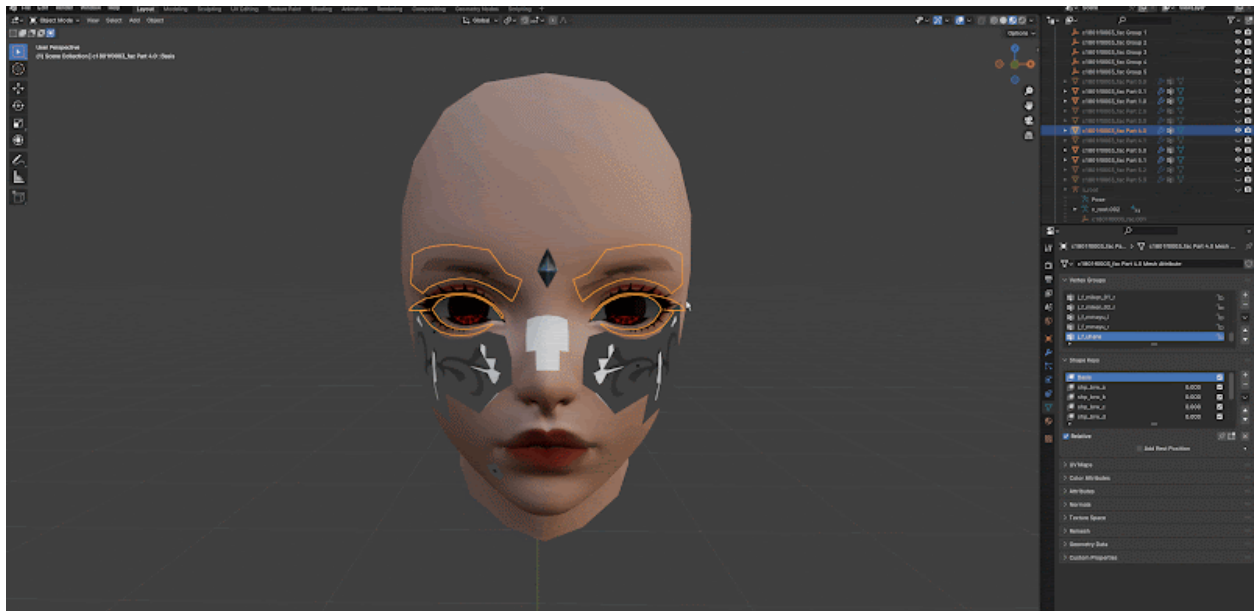
Once everything is set up to how you would like it, you can move on to weighting! Select the armature/n_root and go to *Pose Mode* in the top left dropdown, from here you can move different bones around to see how it affects the head. When you start weighting, give yourself the time you need to understand how all the new bones work together. A lot of weights overlap each other, and one bone that doesn't seem to change anything even if it's weighted in that spot might be changed by another bone weight instead. I'd recommend painting on all the bones in an area when moving a section (i.e. the eyelid position, mouth position) as you might need to paint on multiple bones and weights to change one section (for example the top eyelid has 3 main bones, one for the outer corner, one in the center and one on the inner corner, as well as bones around the eyebrows which can also affect the eyelid). A lot of it will be trial and error, and testing weights at the moment in the benchmark is trickier due to not being able to check emotes like you can in-game, so although it is good to get a headstart now with testing out the weighting - from what I have tested so far I expect it'll be a lot easier to know if it works in-game once 7.0 is out and modding tools are available. If weighting isn't

working how you would like, please go to '[What if Method 1 does not work](#)'.



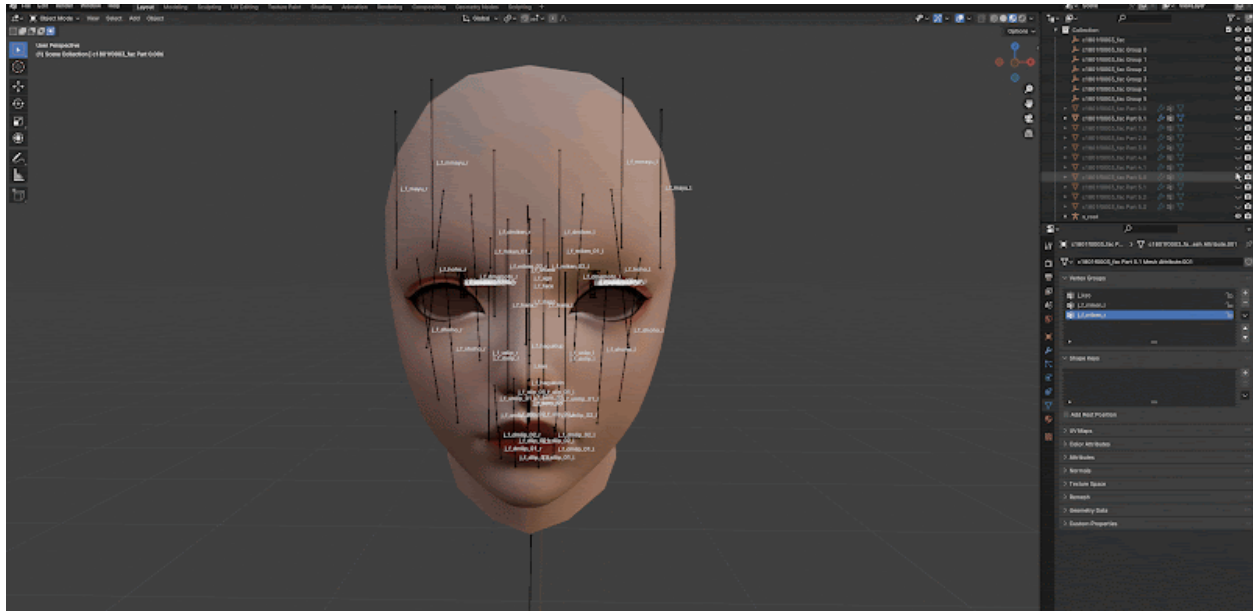
Once you're happy with how the face looks, you will need to weight transfer every part individually from the 7.0 face to your sculpt (i.e. eyebrows and eyelashes, face tattoos, beauty spots). You can do this either by unhiding the part you need from the 7.0 face and selecting a specific part, for example the eyebrows and eyelashes, then selecting the same section on your sculpt and doing the same process as before with *Weight Transfer* in the *Weight Paint* section. Additionally, you can try pulling the weights from the updated sculpt face weights and transferring them across, for example selecting your weighted sculpt then selecting a beauty spot and using *Weight Transfer*. Keep in mind if you adjust the eye weights you will also need to adjust the eyelashes and

possibly eyebrow weights manually.



As a general note, and something I'd recommend doing before porting into the benchmark is removing the current eyes, eye shade, and iris and replacing this with the one in the 7.0 sculpt. The way the new eyes work is a lot different to the old ones and will likely cause weighting issues as the eyeball and iris are now all one texture compared to the old sculpts which have the whites of the eye and the iris as separate parts. This can be done by using *Alt + D* to duplicate and tick off *Linked* in the menu that pops up, take the new part - whether it be the iris or the mouth - select your armature/n_root, right click and go to *Parent* and press *Armature Deform*. If you use the vanilla teeth I'd also suggest deleting all the faces for it in your sculpt and replacing it with a cut out of the teeth from the 7.0 head due to the new bones within the mouth and

bones for the tongue, if you do replace the teeth remember to also update the textures.



When you've done this you can try testing out in-game, feel free to keep doing this at any point throughout this method for weight testing as there'll likely be some back and forth between the Benchmark and Blender. If you have both models in Blender make sure to select everything from your sculpt, including the armature, and export out as an FBX with *Limit to - Selected Objects* and *Triangulate Faces* under the Geometry section ticked on (keep in mind this breaks shape keys but this shouldn't be a problem if it has no shape keys). Then import your head into the Benchmark version of TexTools, you'll likely have some broken toggles but this can be fixed later, if you want to learn more about face variants/toggles I have an explanation in my sculpt [guide](#). You'll also want to replace all the fac_a and etc_a/etc_b textures with your sculpts textures as there are new textures for the 7.0 faces with different UVs. This'll make sure your model is pulling from the correctly UV'd textures for both your face and your eyebrows/eyelashes/tattoos etc.



After everything is in you can test it in the Benchmark! I usually close TexTools before going into the character customisation as it will likely cause the benchmark to crash. From here it is mostly rinse and repeat of testing in the character creator and adjusting weights/textures etc. in TexTools and Blender.

Information about pre-DT textures:

If you end up using this method, depending on if it's a sculpt you have made or one you have installed, I'd recommend importing in the modpack, or making a modpack of your entire sculpt (with everything including the head model, makeup, eyebrow/eyelashes textures etc.) into the benchmark version of TexTools then importing your re-weighted head. This'll help a lot with not having to manually import textures one by one plus it should also have the correct toggles.

If you are uploading textures into the TexTools benchmark version they currently can only be uploaded as DDS files - the plugin for this can be found [here](#). I've found exporting at 8.8.8.8 for the DDS file works but I believe other formats do as well.

Additionally, quite a few of the colour channels have changed in 7.0 so you will likely need to make adjustments to the colours of certain texture maps, if you can I'd recommend referencing from how the maps look in TexTools and adjusting the colours based on that. From what I've found so far the multi map definitely needs to be altered.

Information about 7.0 textures:

With the changes to the face UVs, if you're using the 7.0 face you'll want to update the textures for the face, the eyelashes/eyebrows/tattoos etc., and the iris. If you want a smoother way to do this, Sebby has made a brilliant tool for face texture baking from pre-DT to 7.0 which can be found [here](#).

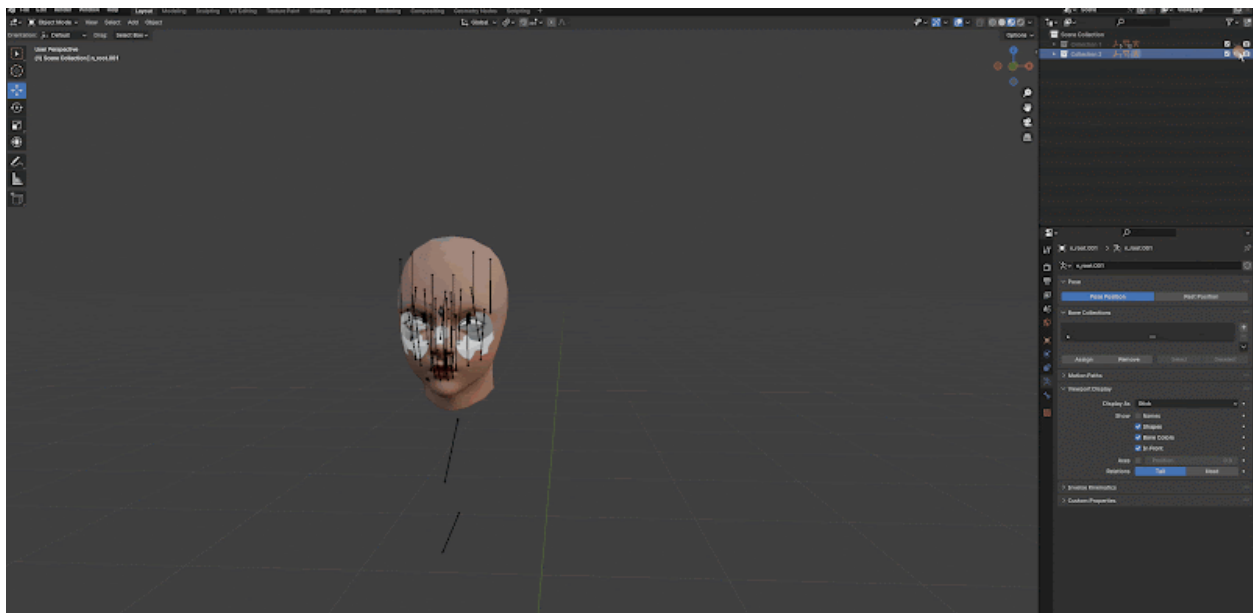
What if Method 1 does not work:

Whilst you're weighting your sculpt, you may end up hitting a bit of a roadblock where even with certain weights painted in a way that looks like it should work it'll pull from parts you don't want after testing out different methods. This'll likely happen on sculpts that are quite different to the base face. On my most recent sculpt I kept running into the issue of being unable to separate the lips from pulling together, plus I had issues with how the eyes were closing compared to the 7.0 face. If you're set on wanting your original face in the game then it may be worth sticking to Method 1 and testing it out more, but if the weighting has caused you a lot of hassle and you want to start fresh then Method 2 may be worthwhile.

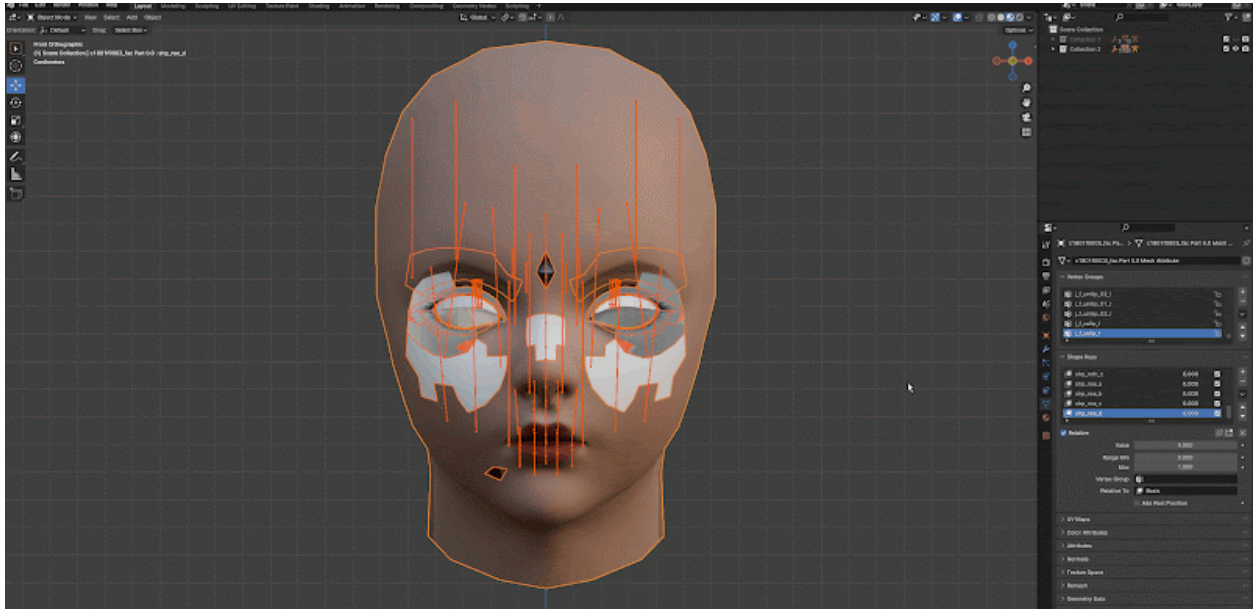
Method 2 - Starting again:

Although this method is more tedious it may end up also futureproofing the sculpt, here I'll explain how to remake your sculpt on the 7.0 head from scratch. Compared to method 1 this will likely take longer, and the maps will also need to be updated to the new UVs by using the xNormal tool, but there is the benefit of not having to re-weight every part of the sculpt and also getting to make use of the new head models. I'm aware this way is quite rough, especially when starting again, but I've found the newer heads are generally much easier to work from and the maps look a lot better compared to the older ones.

I'd recommend setting up your face diffuse map first through xNormal and adding it into Blender on the 7.0 sculpt so you can work around that, I found it easier to compare it to my old sculpt this way. For makeup baking in 7.0 please check Parker's brilliant [guide!](#) Adding textures in Blender can be done by selecting the face, going to the *Shading* tab, dragging the texture into the Node box and taking the *Color* section of your texture and linking it to the models *Base Color*.

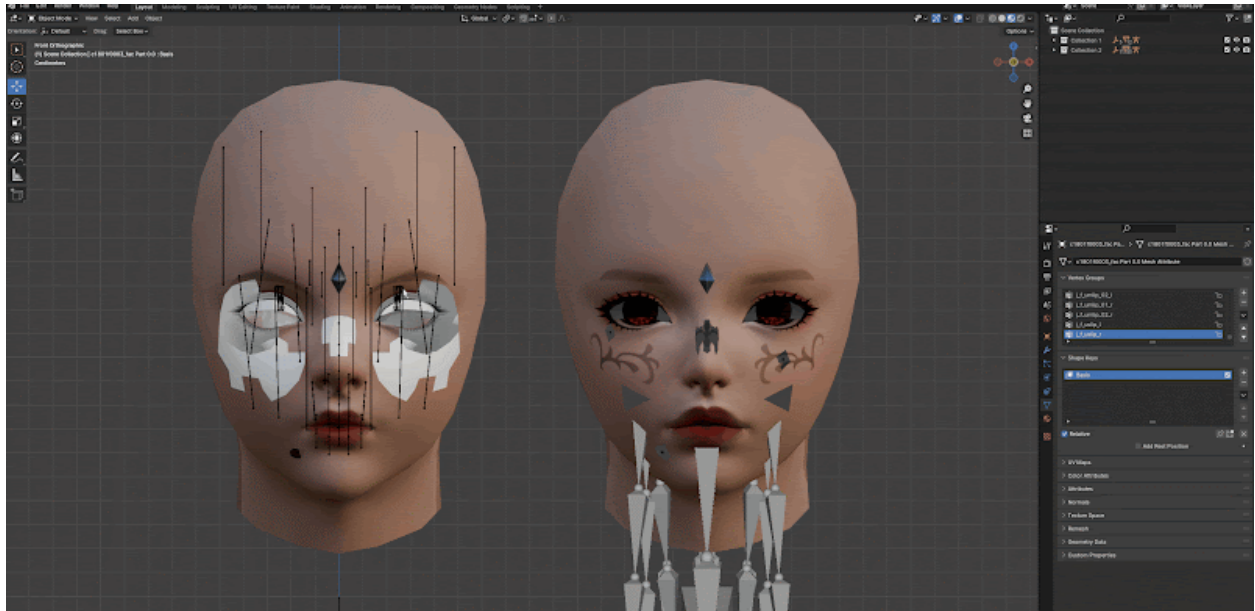


Using the same as Method 1, take the same base face as what your sculpt is from and import it into Blender. I'd suggest making two collections and importing the new 7.0 head into one collection, and your current sculpt into the other collection. Before making any changes to the model you'll want to remove all Shape Keys except for the Basis key. This can be done by selecting all by pressing A, going to the little triangle icon *Object Data Properties* in the bottom right corner and removing the Shape Keys. Make sure not to delete any Vertex Groups as these will be important for keeping your models armature intact.



Next you'll want to hide everything you do not need for now on both head models by selecting the part and pressing H, I'd recommend hiding everything except the actual head shape. From here you have a few options, either you can work from the poly count of the head already as it is higher-poly than the current face, or if you want more detail

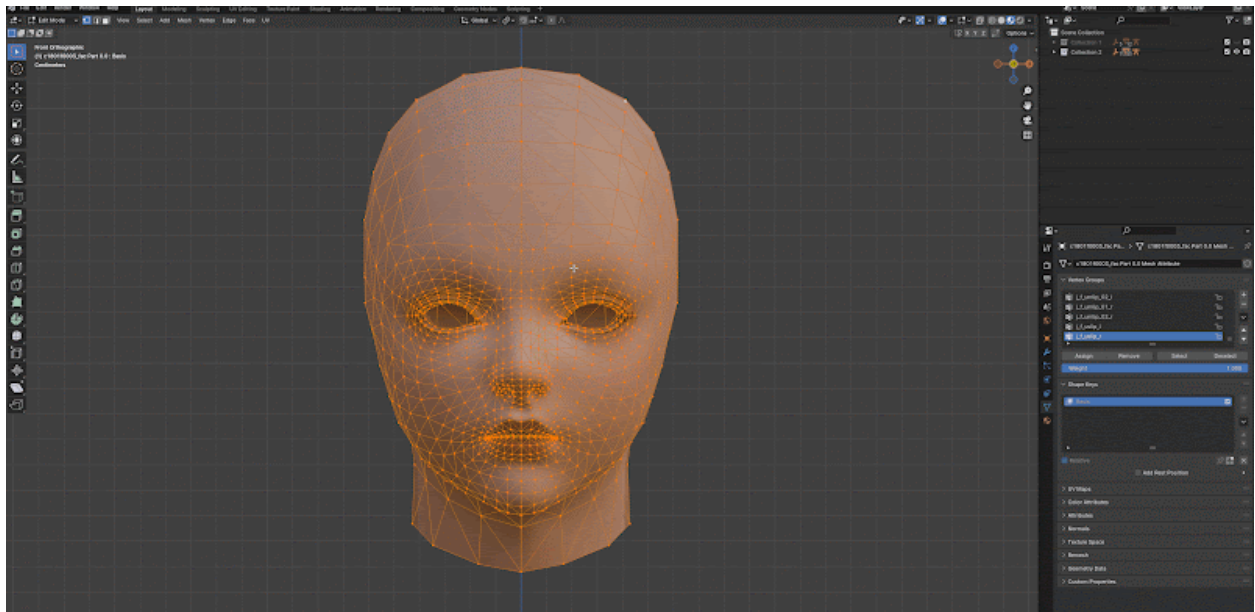
you can subdivide the model and increase the poly count.



The process to high-poly the 7.0 face is the exact same process as before. If you're unsure of how to do so please check out my previous [guide](#) under the section of *Creating your high-poly model* as it'll explain my process of making it high-poly.

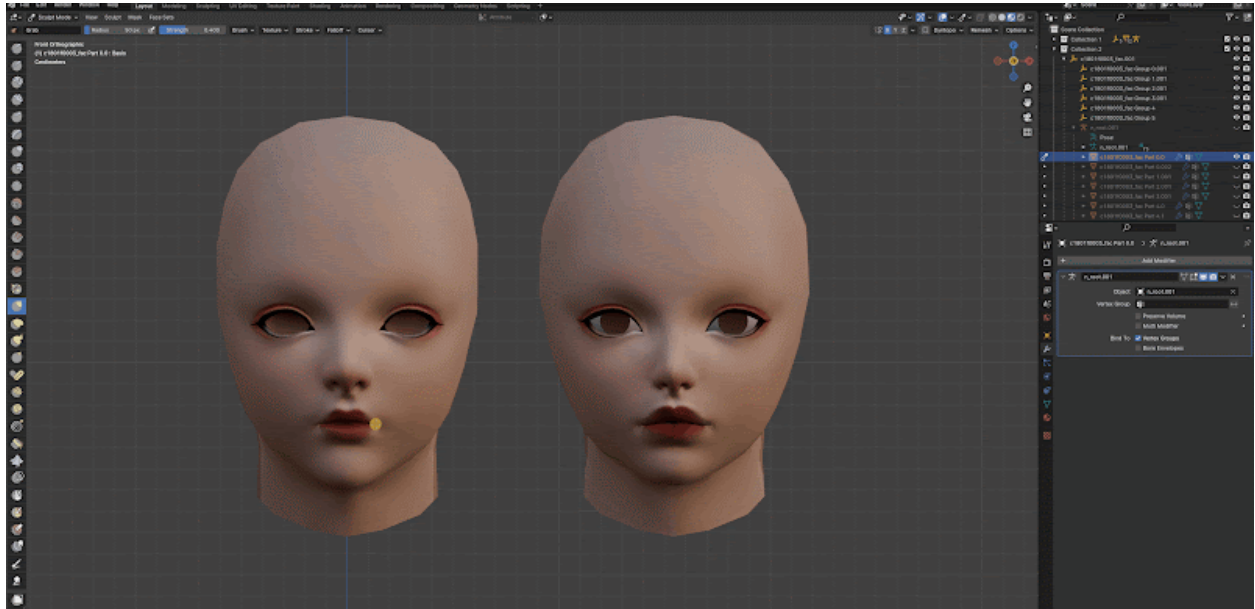
Make sure to merge vertices as well before sculpting the face.

I'd recommend deselecting the parts of the mouth too before increasing the poly count. Keep in mind the process of merging facial parts together is no longer relevant on the 7.0 faces as this isn't a problem on the new faces.



Once you are happy with how the 7.0 head is looking, we can move on to updating the 7.0 head to look like your sculpt head. There's a few ways to do this, one is to

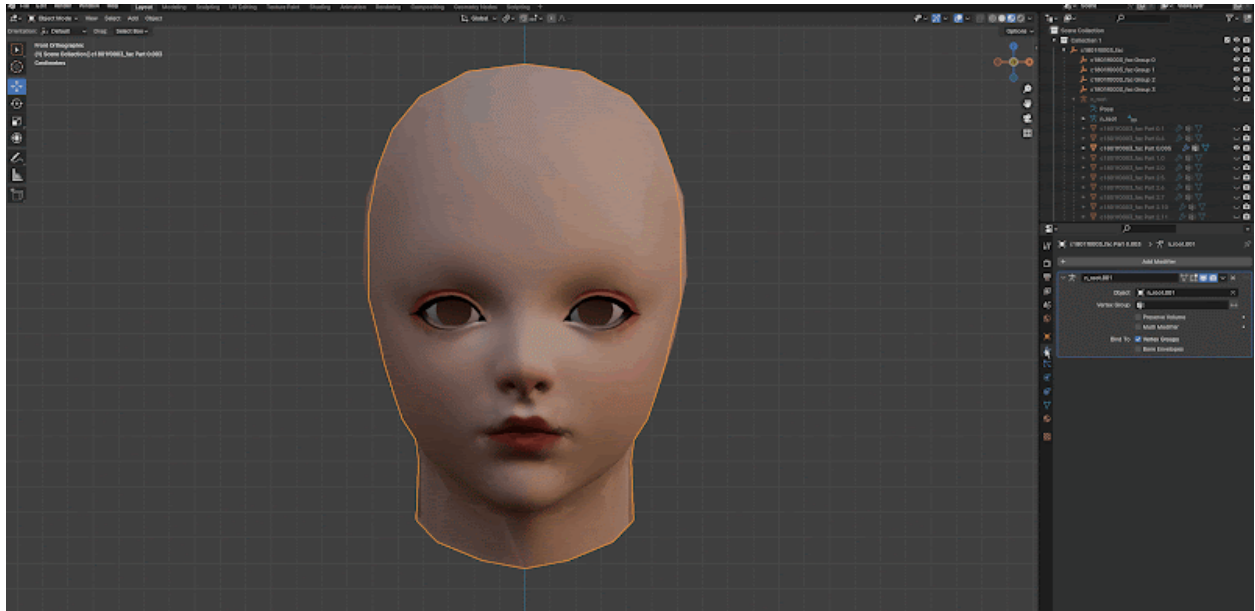
Shrinkwrap the 7.0 head onto your sculpt to get a similar face shape, this isn't always fully accurate with how it pulls from the head model but works well as a base. The other approach is to fully start from scratch and re-model the heads next to each other and reference back from the sculpt. For now I'll explain Shrinkwrap, as it's a great base to start from!



Before doing this I'd suggest duplicating your 7.0 head by using *Alt + D* and having the *Linked* tick box turned off as this will affect the normals. Additionally, you'll need to remove the *Basis Shape Key* to apply the modifier. Make sure your old sculpt is also in the same location in Blender as your 7.0 face. To shrinkwrap the 7.0 face, select it and click on the wrench icon for *Modifiers*, from here click *Add Modifier* and either search or use the *Deform* tab to find the *Shrinkwrap* option. For the *Target*, use the eyedropper tool to select your sculpt or find it in the drop-down menu. In the *Wrap Method* drop-down I've found *Target Normal Project* works well, and for *Snap Mode* selecting *Inside*. Once done, click on the down arrow next to the camera icon in the *Shrinkwrap* box and press *Apply*.

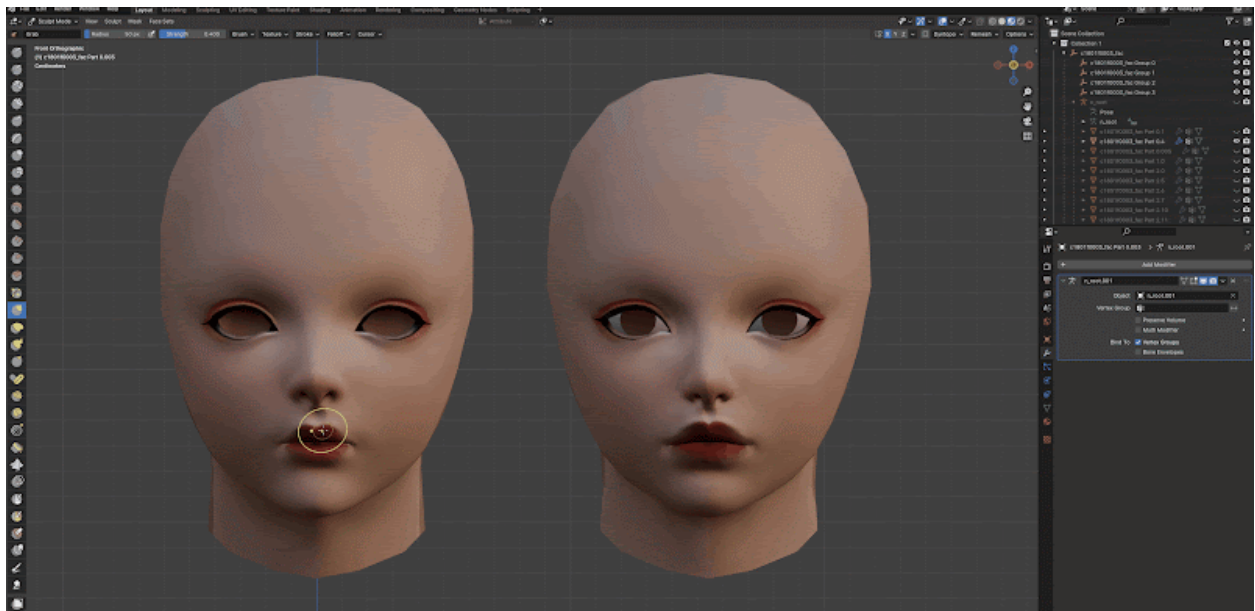
When you have done this you'll find the model looks quite bumpy. To fix this add the *Data Transfer* modifier and select the head you duplicated earlier for the *Source*, turn on *Face Corner Data* and in that drop-down turn on *Custom Normals*, then for *Mapping* choose the *Nearest Face Interpolated* option. Then apply this to the head the same way you did for the *Shrinkwrap* modifier, once this is done you can delete the duplicated

head.

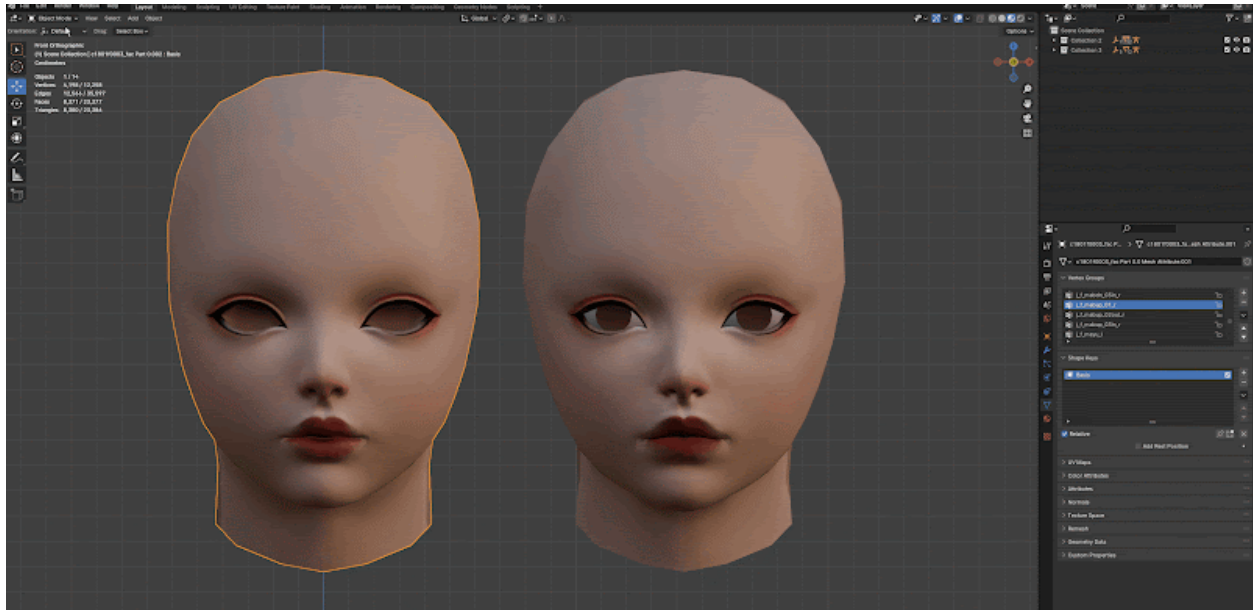


This modifier from what I have found works well on the nose and mouth but it struggles to make the eyes bigger if you have them larger on your sculpt. It likely won't give a 1 to 1 match of your sculpt, but it works well for a base to work around.

After this you can work on adjusting the head shape to match your sculpt. I've found having the 7.0 head and my sculpt next to each other helped as a comparison, although it's been a bit more work I've really enjoyed working on the 7.0 faces so far as the normals look so much better. If you want a direct head-on of your sculpt, when moving the camera with your middle-mouse button press the *Alt* key as you can see the sculpt from the front and side a lot easier than on the free camera.



Keep in mind when adjusting the 7.0 head that anything that has greater changes from the base face will require reweighting work, there's no way to avoid reweighting the heads in some way both with Method 1 and 2 as it's changed a lot from the older models. From what I have tested so far the majority of the weighting work is needed around the eyes especially if they're made larger, the mouth needs some fixes too but it's more around the corners of the mouth if they are made wider.



As like Method 1, test out your head by importing it into TexTools and checking how it looks in the character customiser. You'll also want to make sure you have the correct textures imported so you can see how your makeup moves with the weights (such as the eyeshadow). This'll be mostly a back and fourth between Blender and TexTools to test weights, and will likely need some adjustments in 7.0 when it's easier to see the weight changes with emotes.

For now, these are the two methods that have worked for me in the benchmark. If there are any other ideas you also have feel free to let me know as I'm happy to test them out and add more methods!

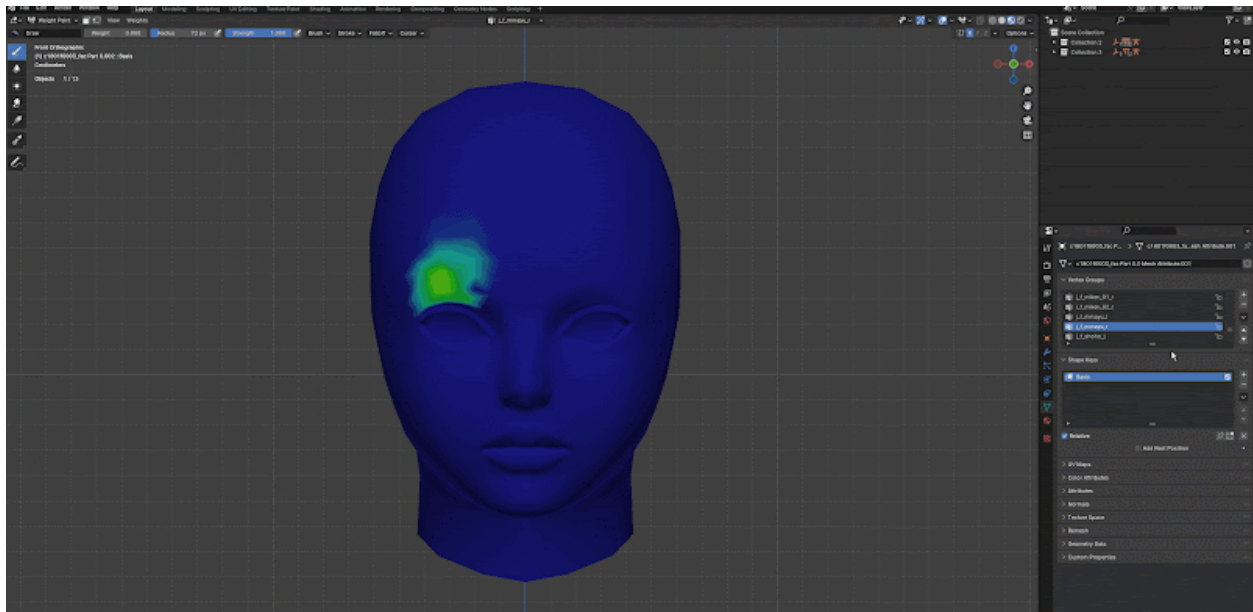
What I've found with the weights so far:

The new weights are a little more complicated to understand than the previous ones, mostly due to there being several weights that can affect a section of the face. I wanted to cover a bit on what I have had to adjust so far to help fix the weights, keep in mind the same name with _r and _l are mirrored, so before painting on one side set it to mirror on the X axis and it will paint on the matching weights on the other side.

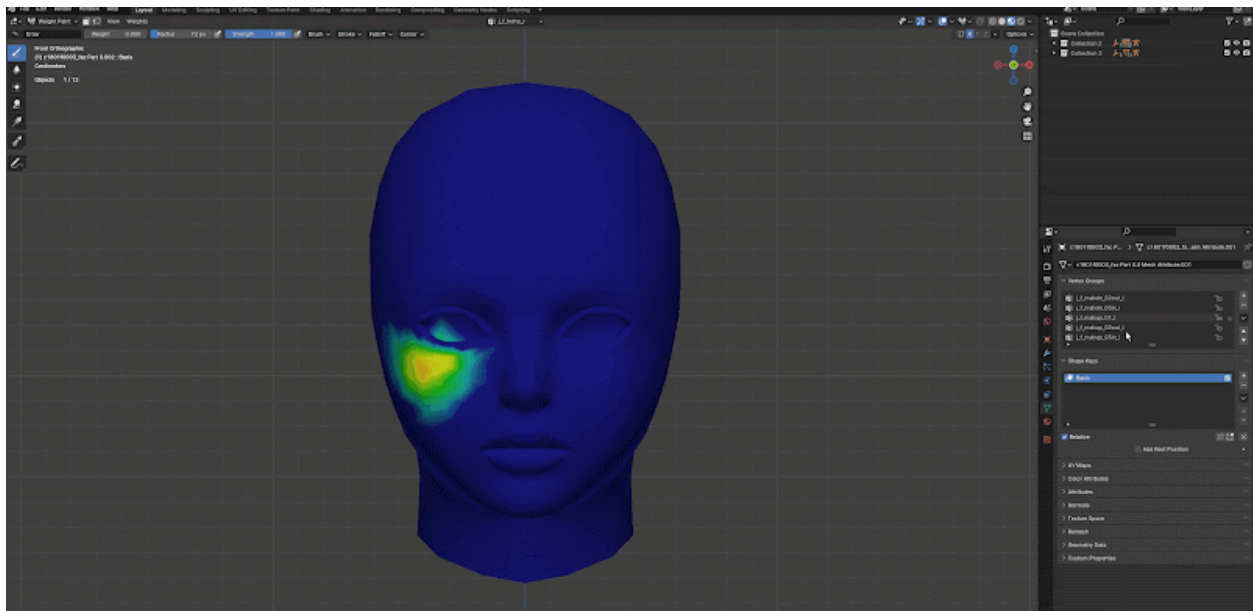
When adjusting the eyes, for the upper eyelid you will likely need to adjust the vertex groups:

**j_f_mabup_03in_r, j_f_mabup_03in_l, j_f_mabup_02out_r, j_f_mabup_02out_l,
j_f_mabup_01_r, j_f_mabup_01_l, j_f_mmayu_r, j_f_mmayu_l, j_f_miken_02_r,**

j_f_miken_02_l, j_f_miken_01_r, j_f_miken_01_l (mabup will need the most adjustments, mmayu and miken may need slight adjustments)



For the lower eyelid you will likely need to adjust the vertex groups:
j_f_mabdn_03in_r, j_f_mabdn_03in_l, j_f_mabdn_02out_r, j_f_mabdn_02out_l, j_f_mabdn_01_r, j_f_mabdn_01_l, j_f_hoho_r, j_f_hoho_l (mabdn will need the most adjustments, hoho may not even need adjustments depending on your sculpt)

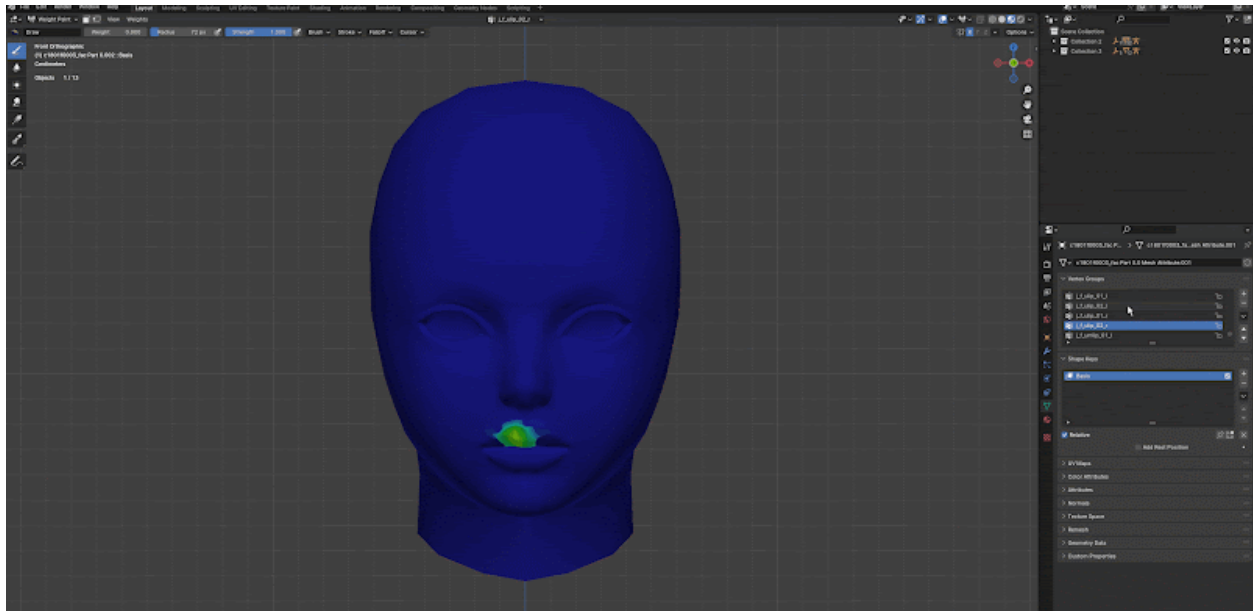


When adjusting the mouth, for the upper lip you will likely need to adjust the vertex groups:
j_f_umlip_02_r, j_f_umlip_02_l, j_f_umlip_01_r, j_f_umlip_01_l, j_f_ulip_02_r, j_f_ulip_02_l, j_f_ulip_01_r, j_f_ulip_01_l

For the lower lip you will likely need to adjust the vertex groups:

j_f_dslip_r, j_f_dslip_l, j_f_dmlip_02_r, j_f_dmlip_02_l, j_f_dmlip_01_r, j_f_dmlip_01_l, j_f_dlip_02_r, j_f_dlip_02_l, j_f_dlip_01_r, j_f_dlip_01_l

And generally for the lips you'll want to adjust **j_f_uslip_r, j_f_uslip_l** and possibly **j_f_shoho_r** and **j_f_shoho_l**.



As for the eyelashes and eyebrows these will need to be adjusted manually to match the positioning of your eyelids as they use the same bones, you can test out a few settings in the weight transfer options but I've found it works better to weigh them myself with the eyes partially shut so I can work around the eyelid.

From what I have done so far I've found the eyes need the most work for reweighting especially when made wider or larger. The mouth, even when made larger, doesn't seem to require as much adjusting but you will want to look into the weights as it can make the side of the mouth curve up too much. I've found the nose and cheek weights seem to move around pretty well even after being adjusted.

Current thoughts on prepping for DT:

From what I have done so far with sculpt porting, I think from a level of easiest to hardest it's currently a lot easier to prepare any textures you need in advance, such as baking makeups to the new UV for example if you need to, then focusing on final weight adjustments later.

The weights can be adjusted in advance within the benchmark, but I think it'll be a lot easier to test things out once TexTools and Penumbra are available within DT by using a TT dummy folder and Penumbra as the way to test it with different emote options. It doesn't hurt however to get a head start with testing the weights now, but it might be worth holding off on face swapping/porting the re-weighted heads until you're happy with how it is on the base head.

As some final words for now, please be kind and patient with yourself when updating to 7.0, it will likely take some time to get used to the new bones and weights so make sure you give yourself that time to become comfortable with them. We're all in the same boat going into DT with the new heads, so I hope we can all support each other with any new information that comes out after launch. Additionally, feel free to reach out to me if you have any questions either through Twitter or Discord at Emerri.

Thank you so much for reading my guide and for all of the support! As always, if there is anything you're uncertain of or something that seems incorrect in the guide please let me know and I'll get it adjusted. I hope you all enjoy Dawntrail and have a great time going through the story!