SomeArtist
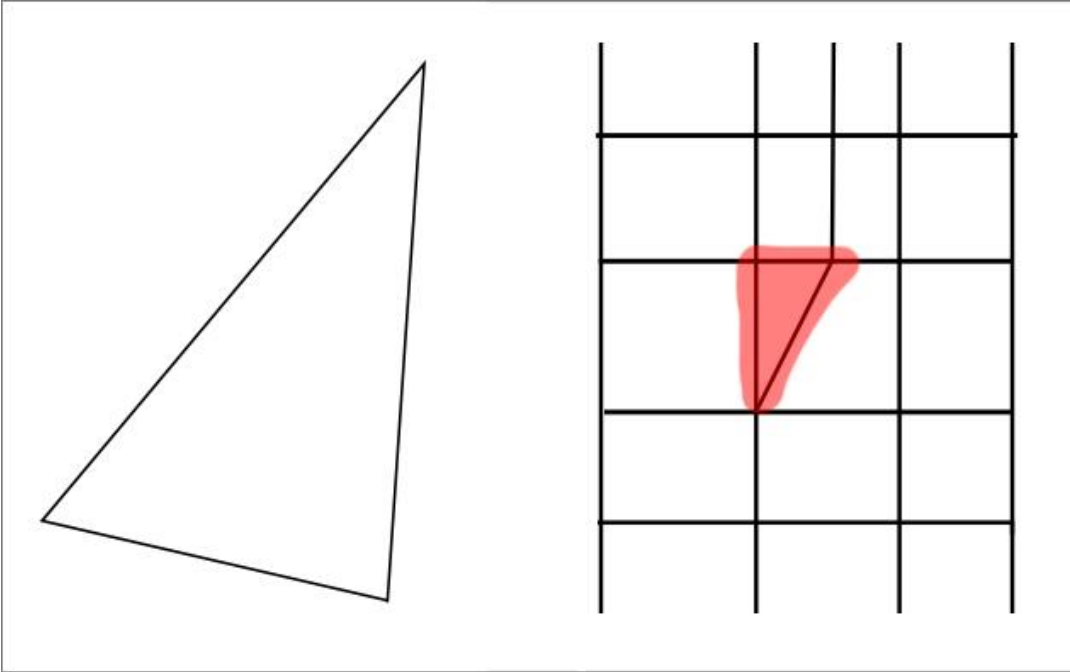
Organic modeler

⬤ The Pole

Have a careful look at this Triangle image because it holds the key to *mastering* Sub-D modeling. Triangle is the smallest element in a 3d model and by knowing how to solve Triangles you will make a big leap forward as a 3d modeler. In fact, once you're through with this thread you'll be modeling like Bay Raitt! (No kidding!)

But first we must understand poles and before you read on make sure to forget what you have learned about Poles! Here is another way of looking at it.

The (E) and (N)

Poles in general are not good for your *Organic* models however, you cannot avoid the 5 and 3 edges poles and instead of being afraid of them why not try to understand them? Many beginners cannot advance to the next level because of this blockage (poles) and so they tend to fear them and then Topology becomes difficult and they fear that too. The 5 and 3 edges poles are very special poles, 6 and beyond are not special so you can ignore them completely and since there are only two special poles we're going to give them names.
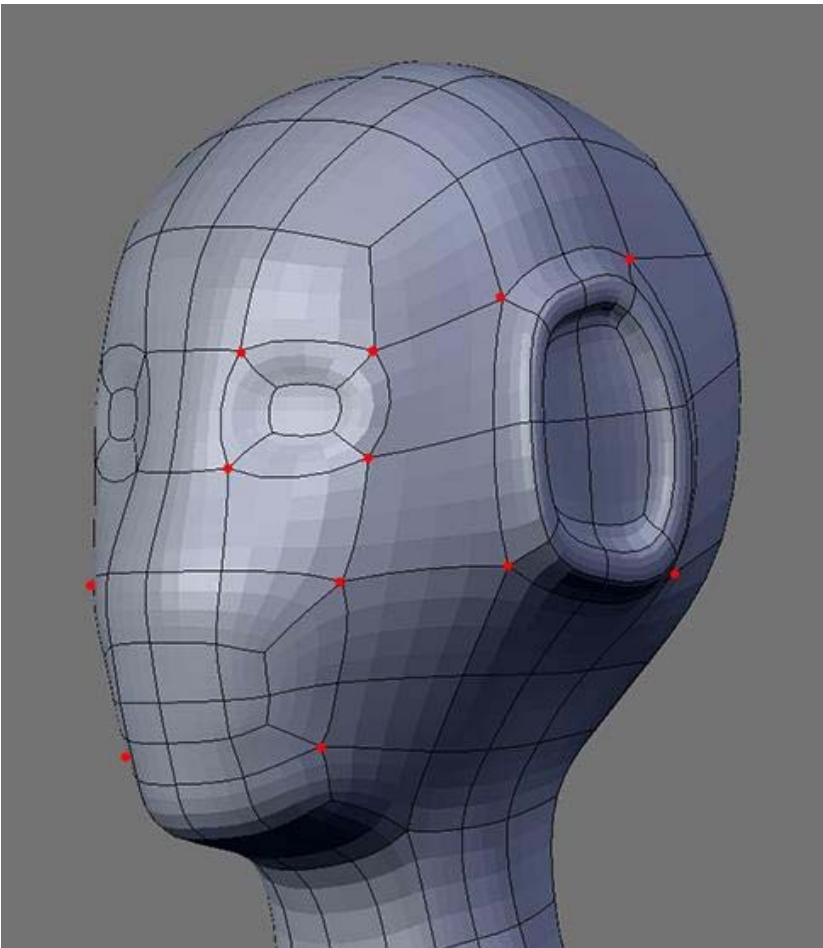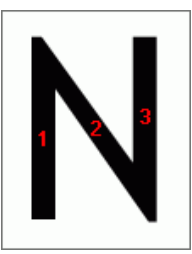
The E(5) Pole
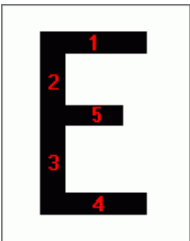
The E pole is actually an "Extrude Pole" (E for short). When you extrude a Quad you will get 4 Es!
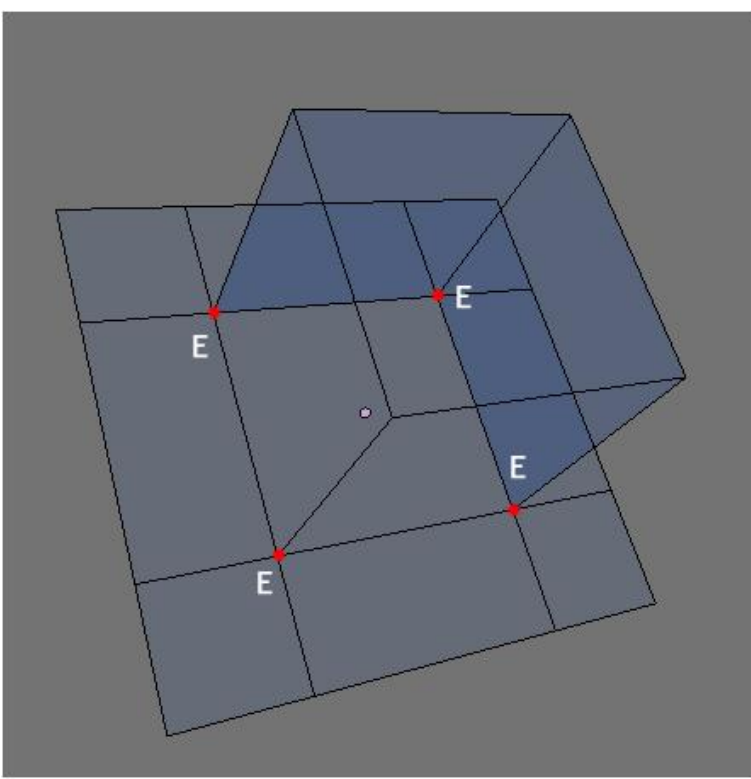
When you extrude for the mouth, eye and ear you'll get 4 Es each. When you extrude for the arm/leg you also get Es.


The N(3) Pole

When you model a nose you'll get this 3 edges pole and there is no way you can remove it because if you do then that nose will not look like a nose and so **it was meant to be there** (Keep that in mind).
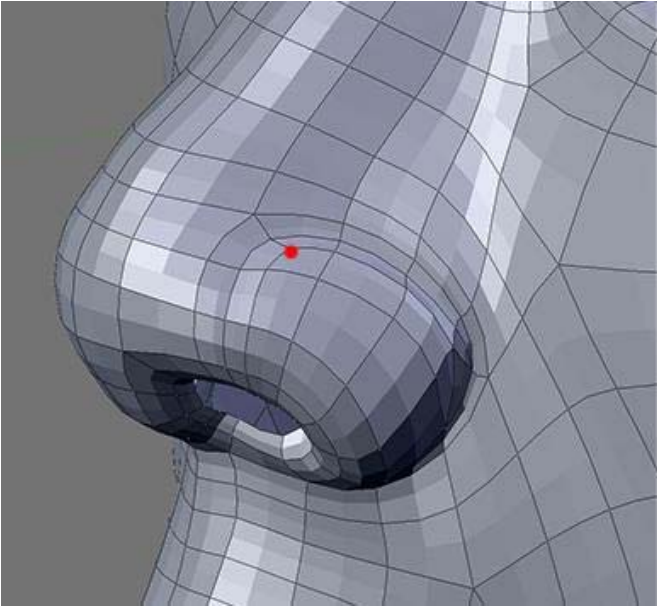
I call this 3 edges pole "The Nose-Pole" (N for short). The Nose is a very special case in that you get "E" and "N" next to each other, I call this the "EN" case. This "EN" situation will surfaces once you get into detailing like the nose here. If you remove this "EN" you will remove the detail for the nose and in the image above I have separated E and N with a Loopcut (more on this later).
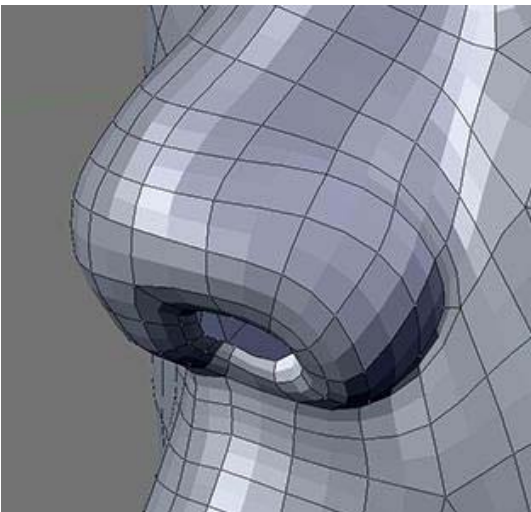
Now why is the talk on Poles important? Poles control how things flow in your topology, have a look at the image below and I'll get back later.
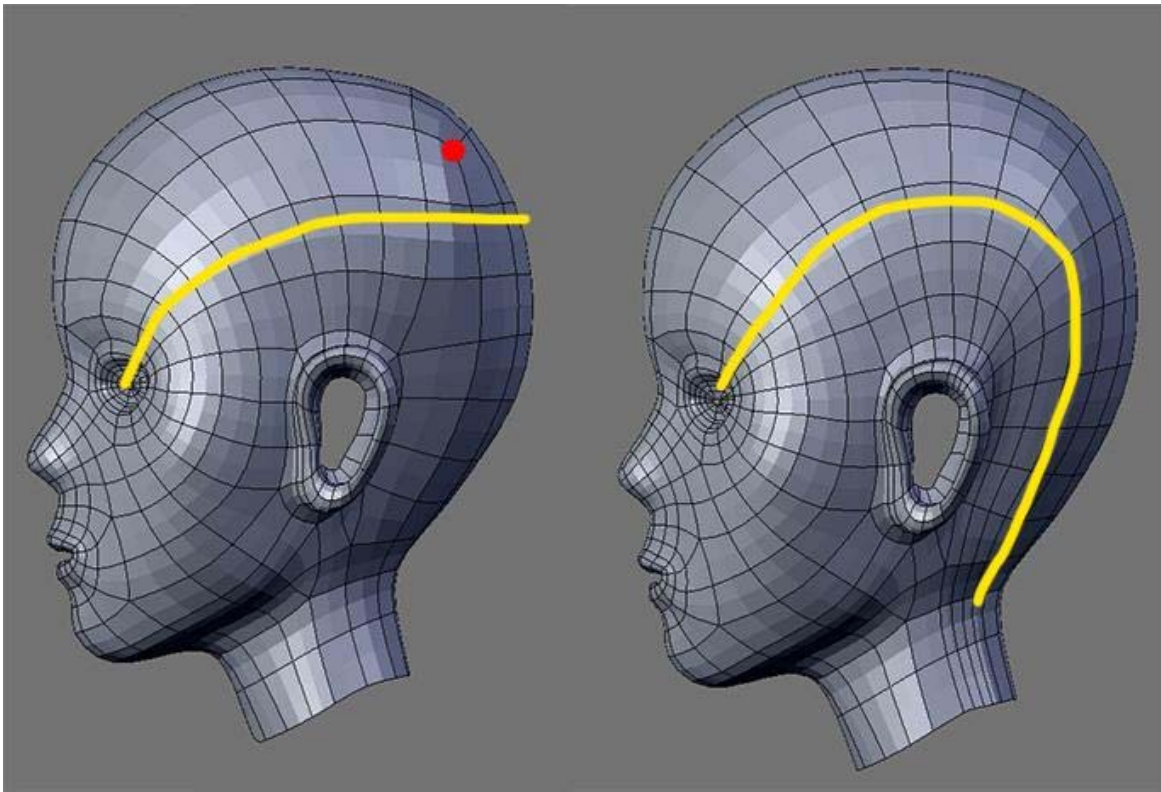
[SomeArtist]

Organic
modeler

The talk on poles will helps us to understand flows and smooth/bumpiness of our meshs. So far Flow was brought up so I'm going to continue with flows then later I'll talk about smoothness and bumpiness.

Flows

The Es cannot be eliminated but the Ns can be. Since we can't really eliminate poles in general what we can do is hide them and eventually they will be gone and *that is the trick*.
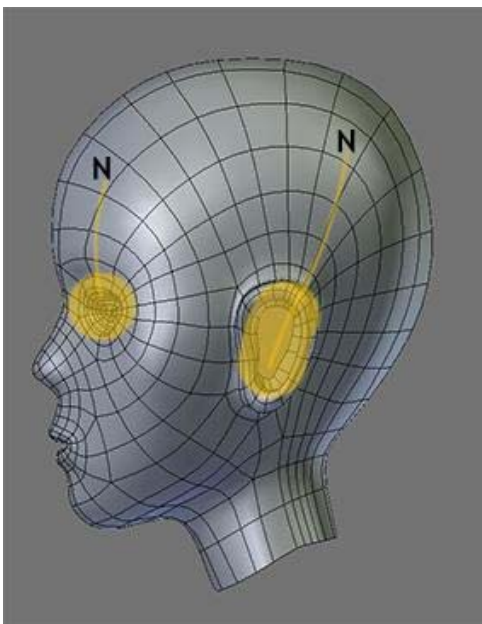
A good example of this is the NPoles for the forehead and the back (if you started with a Box that is). For the forehead you hide it inside

the eye and for the back you hide it inside the Ear. You do it via a method called "UnPole" which I will go in-depth later. Now, just because you can remove NPoles doesn't mean you should do it! Some Npoles are meant to be there like the Nose and when you get into detailing the muscles for the human body you will get a lot of NPoles/EPoles since Poles control flows. A model with complicated flows will have a lot of Poles and vice-versa.

I have argued with a much more experienced modeler about the Npole for the forehead. He told me having the Npole there gives better control for the forehead. Now think about that for a moment.. we all know that Poles make our meshs bumpy. Better control with a price and that price is "Bumpiness" and we all know that the forehead is not 100% smooth! (Underneath is a skull) So yes, you can leave the Npole there for better control of the forehead. Whether you should leave that Npole there or not is up to you. To say "Should I remove it" is the same as saying "Can I use Ngon?" And the answer is always "If that is what you want, then that is what you must do. There are no rules." The picture will get clearer once I talk about smooth/bump later.

E
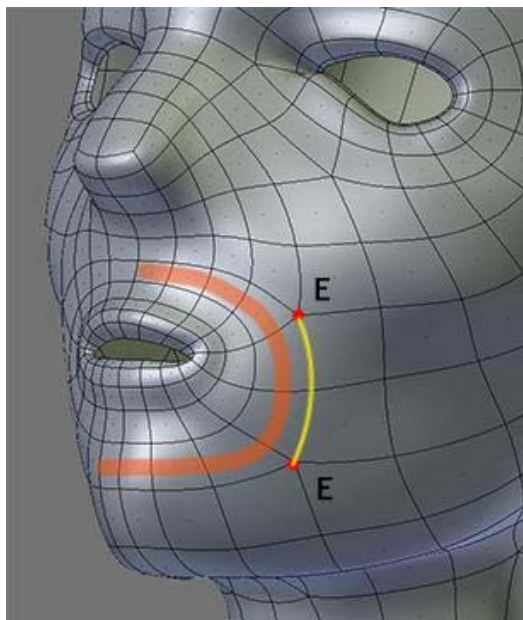
When you extrude a poly you instantly created a circular flow (dark orange in image). In some cases it's good to have a circular flow with Es on the same lane (yellow), however in the case of a human head it's very bad!
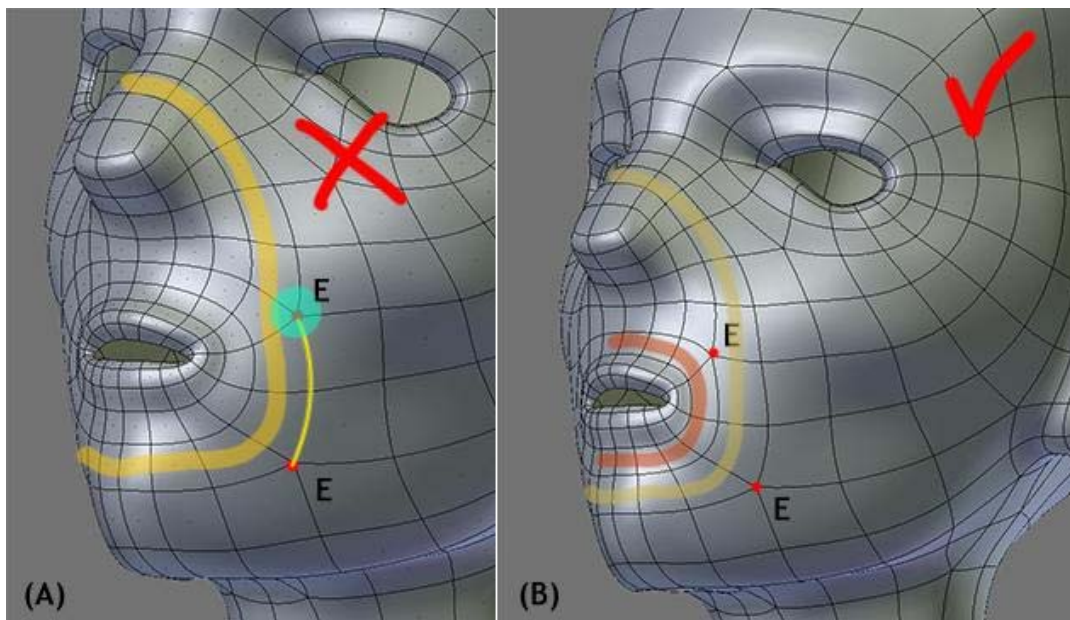
(A): According to the screenshots of human head from professional artists in my collection, this Loop for the mouth is important. You cannot achieve this loop with both Es on the same lane so the trick is to move the upper E to the left lane (B). The next time you see both Es on the same lane you can be sure that it will form a Circular Loop.. If you remove (shifting it elsewhere) the upper E you will break the circular Loop like you are seeing it here.
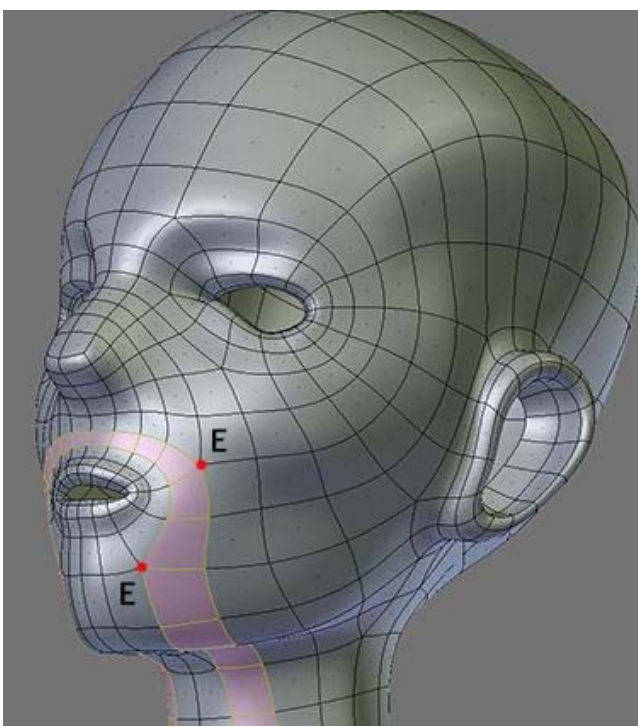
Instead of shifting the upper E I shifted the bottom and this is the result. Pay attention to poles because they are your guide to better flows!

Quote:

when you extrude a quad you get EN not just E

Nice observation!

There are much more to Poles than I first thought. For example, when you extrude a POLY that has N pole as one of its corners, you will convert that N into nothiing (no pole)!
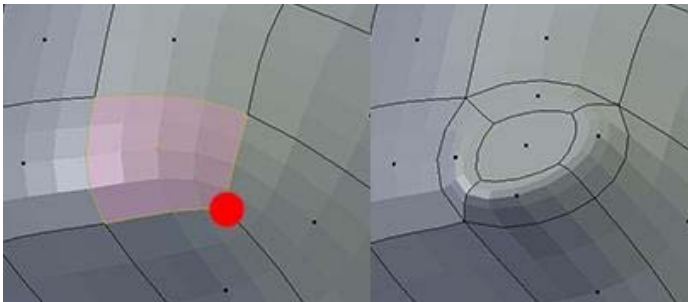
Note: For the first post in total there are 8 images and for this one there are 5. Just wanted to let you know in case they're not showing.
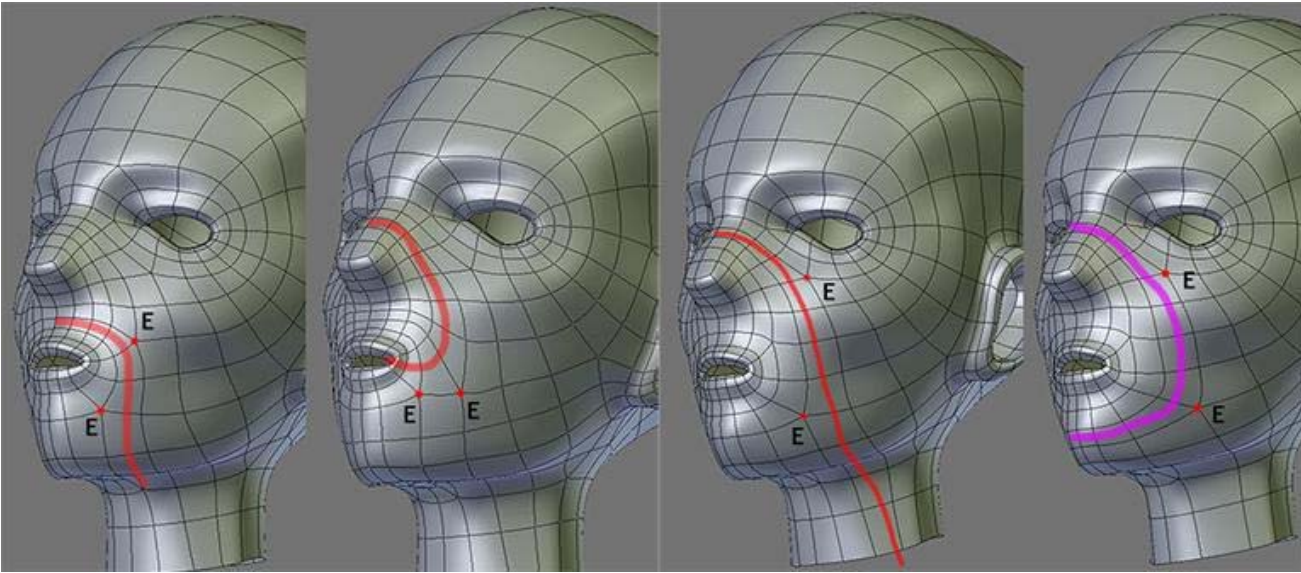
Quote:

#7

Earlier I said that when you see two Es on the same lane you can be sure that it will form a Circular Loop. Here are two more images (below) to confirm that observation.

Pay attention to the Es because by shifting one back and forth you can achieve "predictable" flows! There are no guesswork here.

The EPole for EdgeLoops
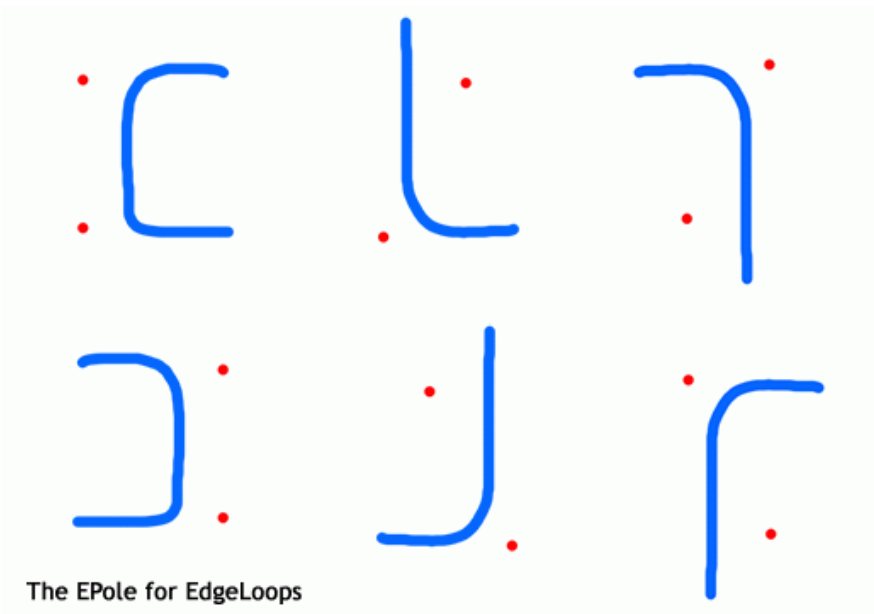
You can use this dot/curve image as guide.

Key-Loop/Fill-Loop

Earlier in the "Form" thread I mentioned the Key and Fill concept and how you can use it in anything that you do. Key-XXX/Fill-XXX, where XXX can be anything and in this case they are Key-Loop/Fill-Loop. When you look at Edgeloop references out there what you are seeing is a bunch of Key-Loops for you to Fill in.
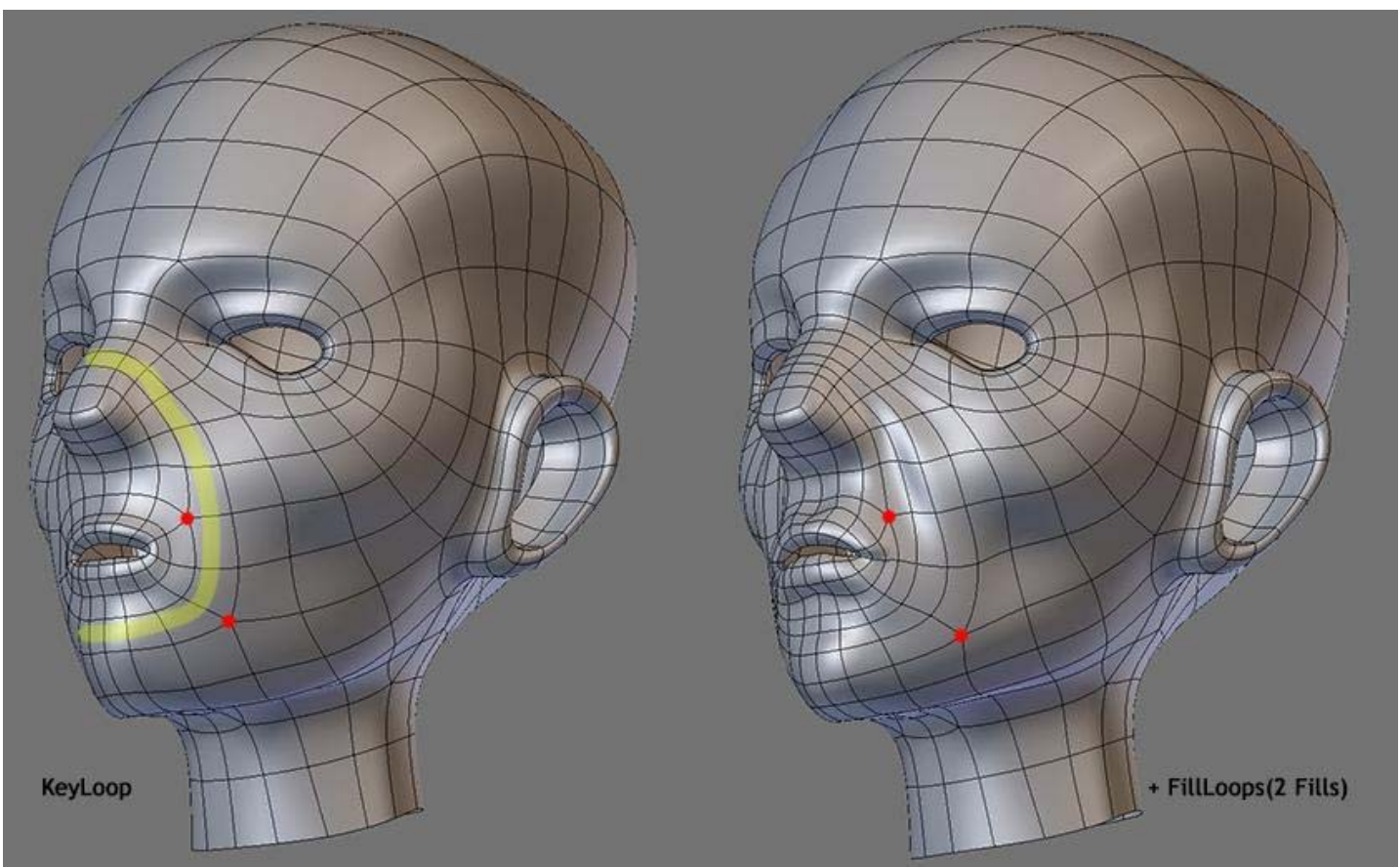
In a KeyLoop stage Poles are close to each other and when you add in the Fill(s) they start to fall apart after the tweak (It's difficult to keep them together after the Fill(s)). During the fill stage you can increase the resolution for the KeyLoop that you're working on and while doing so you can move a specific pole away to a place wher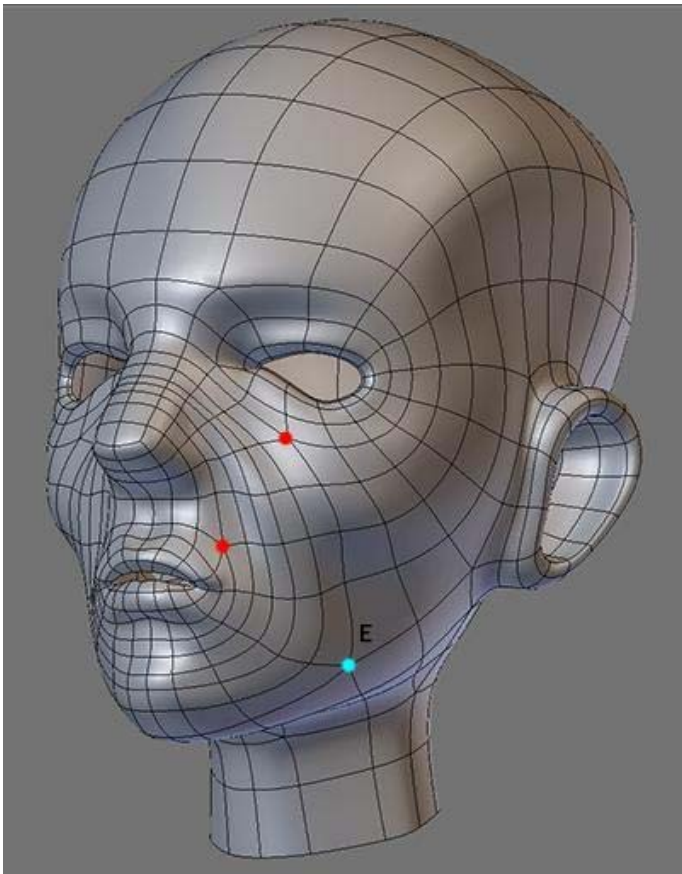e you think it belongs. If you have been collecting wireframe references now is a good time to open them and observe. Immediately you'll learn that all modelers are different in the way they place Poles.

There is no right or wrong but the general rule is: Don't put them in areas that deform and in the image above (cyan dot) I put it there because **I want it there**. When I get into deformation and that area doesn't deform well then I will do something about it but for now I will leave it there. I leave it there because I have looked through many wireframes and I see that pole there... somewhere there and it doesn't

have to be exactly where.

If you're still afraid of POLES then have a look at this thread by Glen: BREAK THE SYMMETRY

In that thread Glen explains to us that the human faces are not 100% perfect. Why are we forgetting this fact? The human faces have dimple, crack, holes and it's never perfect. Now just imagine that poles can be used to represent these features. Hey, if someone say why you have a lot of Poles in your model, just make up a story and say that this character had a car accident! 😀

Note: There are 4 images for this post

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#10
04-23-2006, 02:02 AM

Toontje
Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 46

Man... I would be honored to have you as a neighbour. Your analisys of topology is better then whatever I've encountered out there.

If I learned something is to take a step back and analyse too what the basics are of edge loops and what the functions are of the poles in addition to what you already explained. So permit me to present my findings (and please don't hold back any critiques) 😀

I found that there are 4 ways in which poles are produced on the mesh:
1) extrusion
2) spin quad/ spin edge
3) rip (help me out here, by lack of a better term. It is wath the V key does in Blender.. but I explain more in detail later)
4) Knife tool

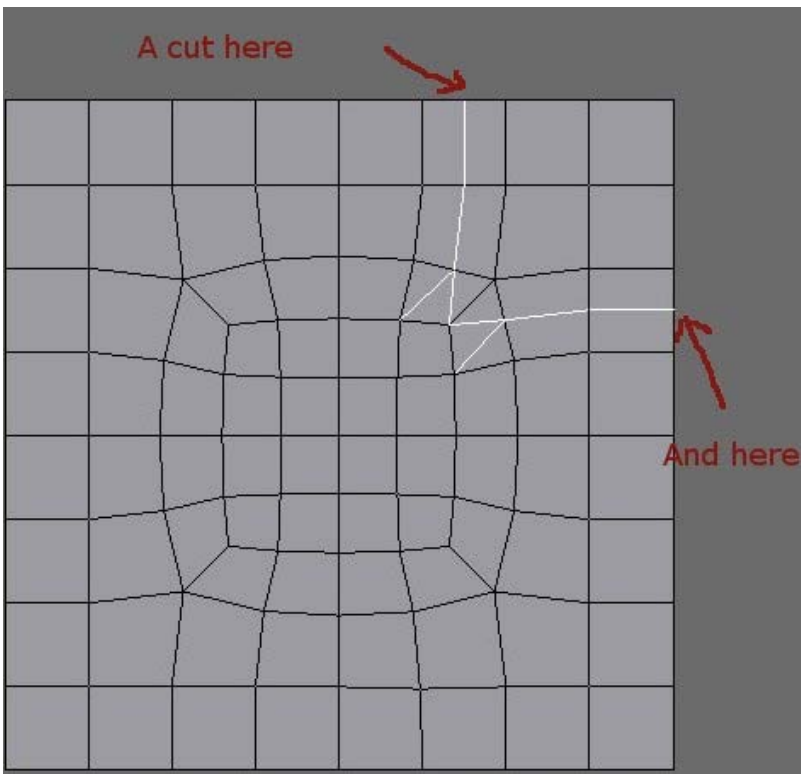I also found out also that edgeloops may overlap on different ways without interfering with eachother

EXTRUSION:

After you invoke the extrude command, you may pull a 'limb' out the mesh, or confirming the command right away, leaving an edgeloop on the mesh.
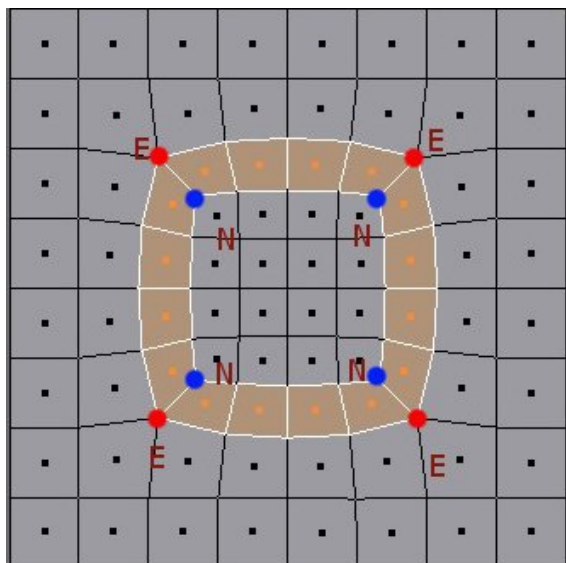
Something was said in the affect that a pole can not be elliminated? Well..you could do it like this:

After the cuts, you are left with 3 pairs of triangles that can be merged into 3 quads. The result looks a little funky, but if you elliminate another **ADJECENT** E pole, you are left with a C-loop
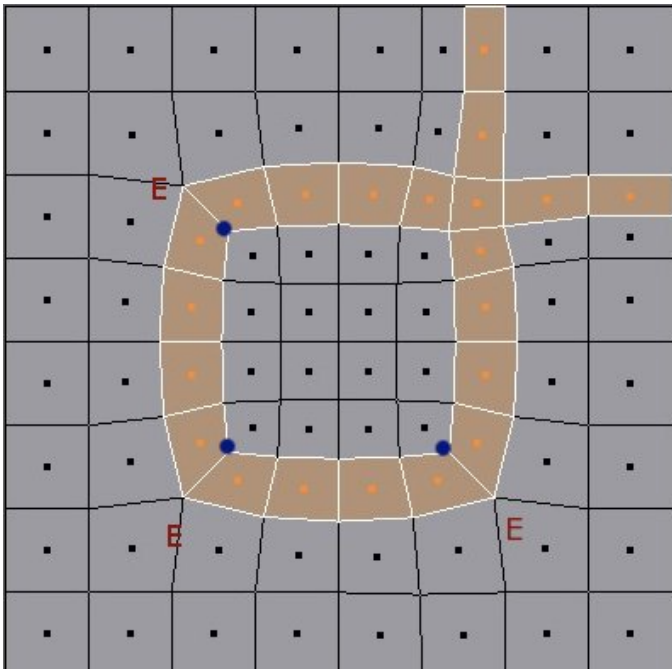
Edgeloops can coexist. So in this way you don't have to be afraid that there might be some dire consecuenses that edgeloops you create might disrupt edgeloops that are already present:
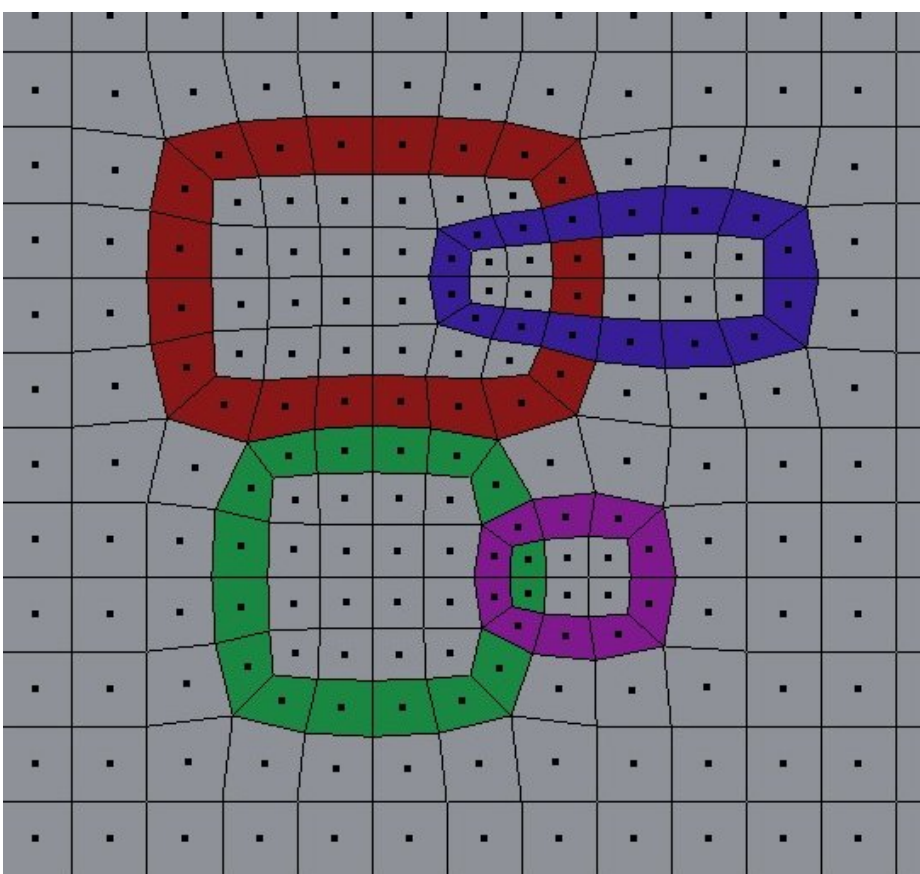
As you can see, loops can touch eachother, intersect or be a part of each outer loop, which is cool. So this means that you can form your eyes loop, mouth loop and pull a nose loop that intersect the mouth (or mouth-nosetip loop) without a hassle. The nose loop could be converted in a C-loop with the technique I mentioned above.

That's it for today...I will pick it up tomorow 😄

Last edited by Toontje : 04-23-2006 at 02:10 PM.

Quote:

The Pole - Page 2 - Subdivision Modeling

C-Loop Topology

Since C-Loop was brought up.
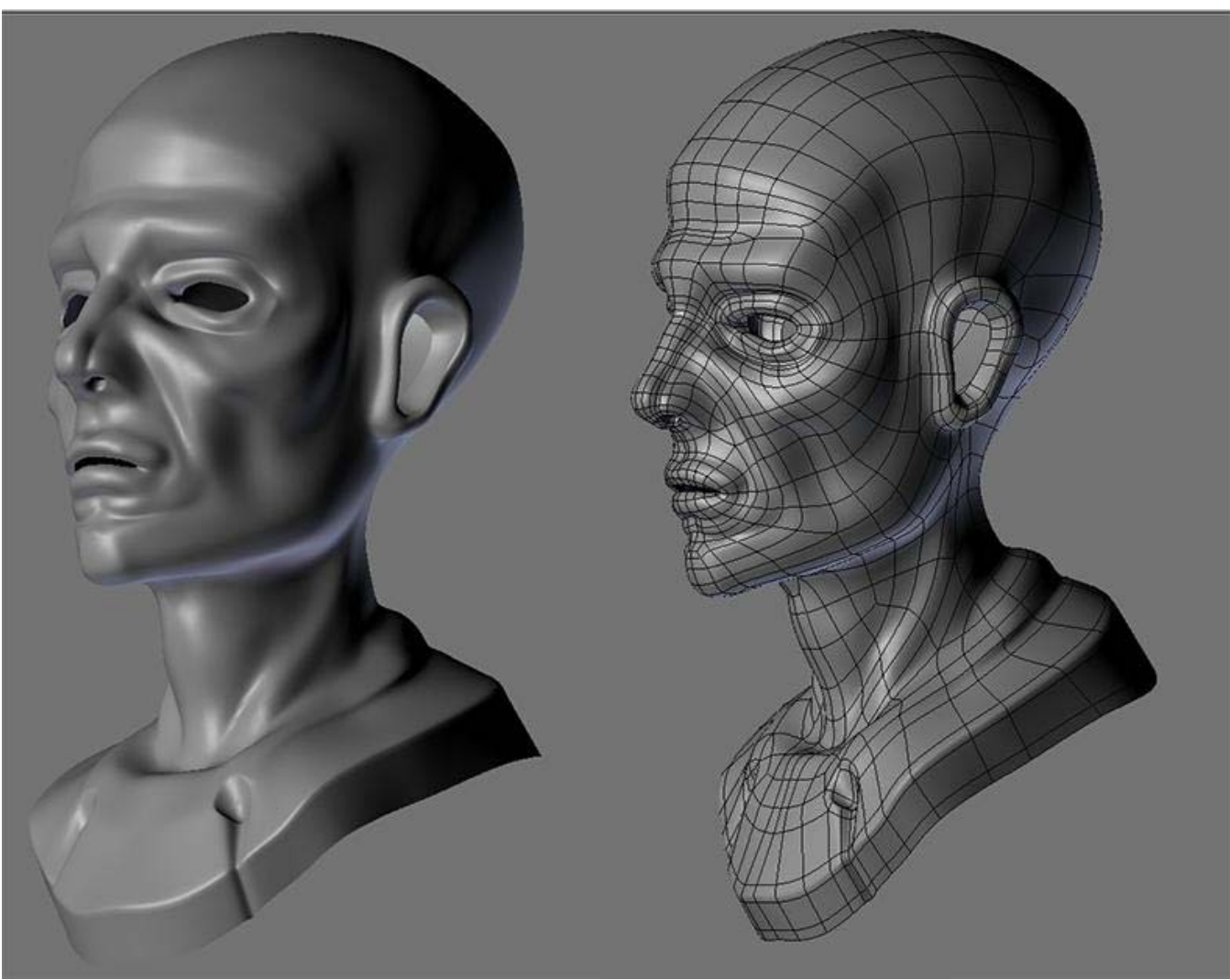
This incomplete head was modeled entirely in Blender from a BOX and it used the CLoop topology. If you're a beginner I highly recommend that you start with this Loop because it's easy and can save you a lot of stress since you're learning best of all you can create amazing result! As you can see from the image above, I have gone far and still using that Loop. Now that I understand Topology after using the Cloop I can branch to other Loops or even invent my own. Here is the Key:

The Power of a Pole: Cut/Bending a Flow!
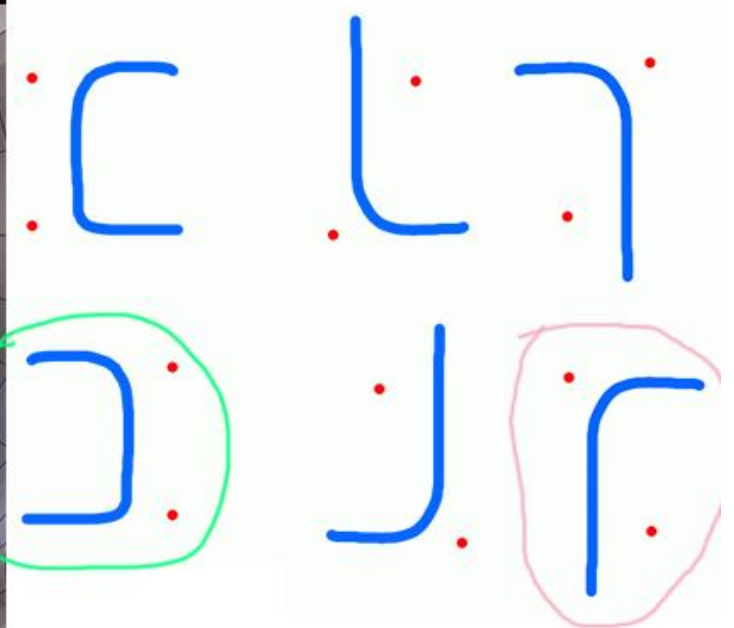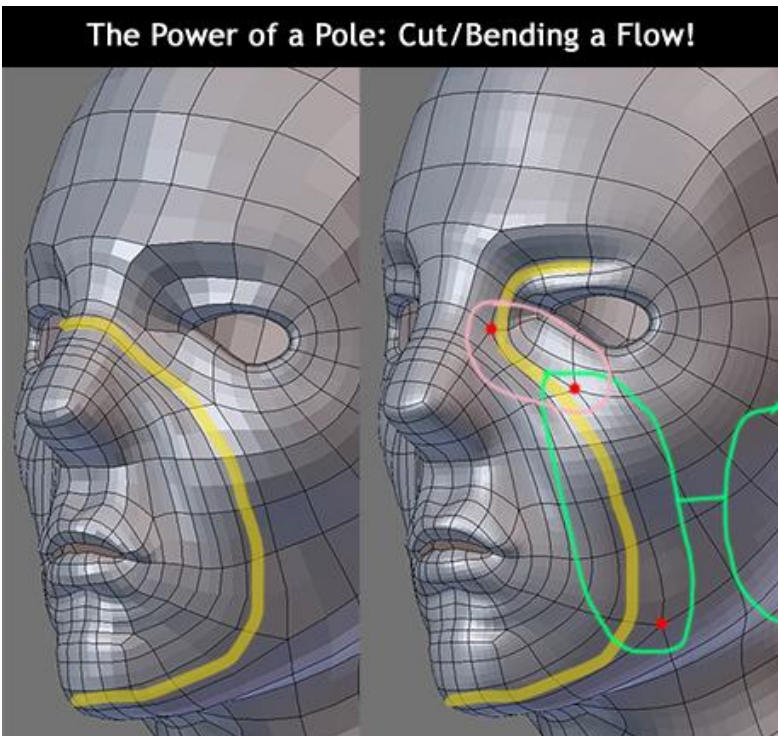
When I look at a wireframe I look for Poles because I can copy the topology using Poles as guide since Pole(s) define a Topology, just look for the Poles. Last, do not be too obsessed with Topologies just read the SUB-D Primer and you'll learn that having a clean/kick-arse

Topology doesn't mean it will deform correctly during animation. However for still images/Zbrush sculpting a CLEAN MESH is best. When you get into deformation and things doesn't work out just use the knowledge here to change/adapt which is better than trying to learn all the topologies that exist out there.

Poleless
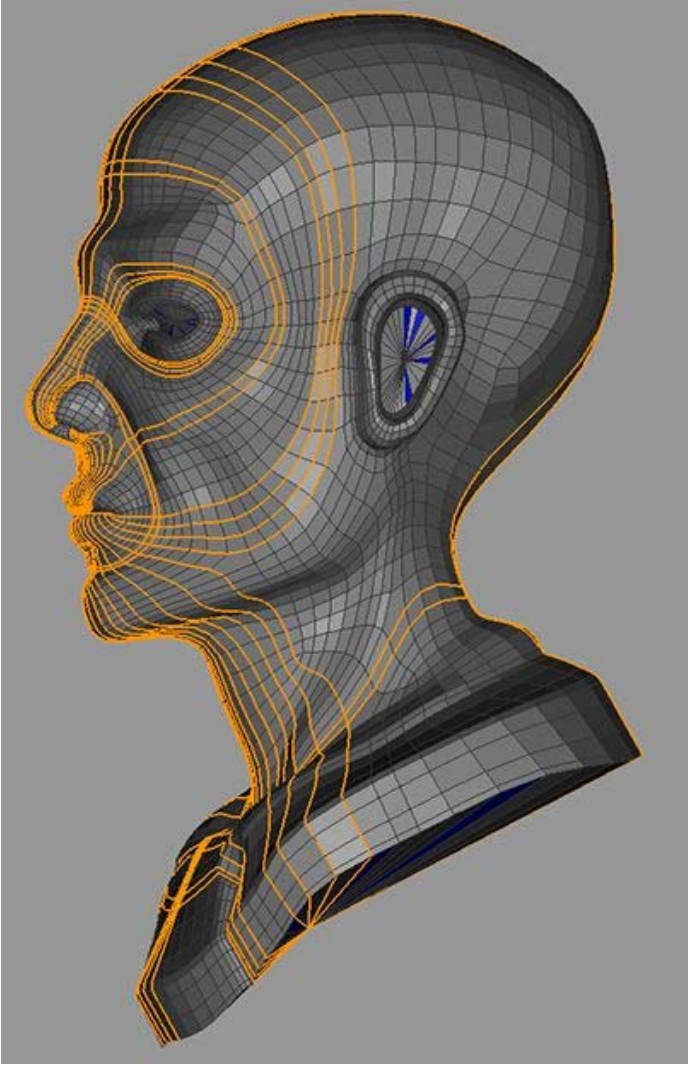
This model is now **100%** Poleless thanks to **shahar2k** at Wings3Ds forum who have shown me the trick and here's the direct quote (for Wings3D):

Quote:

shahar2k:

a little experiment to try,
 1 - take a model made out of 100% quads (any model that is smoothed once already for example)
 2 - set all the edges to "hard"
 3 - smooth the entire model once,
 4 - select all "hard" edges and delete them,
 5 - select all "isolated vertices" and delete those too

The Key idea is to subdivide your mesh and keep the subdivided version while deleting everything else. All the EPoles will be converted into Ngons and all the NPoles will be converted into Triangles! To move Ngons around is to move Epoles around and to move Triangles around is to move Npoles around which is one way or you can do it directly after you subdivided. Once you have a poleless model you can start your Poleless quest, Bay Raitt anyone?

Poleless conversion
Epole --> Ngon
Npole --> Triangle

I don't know why anyone would want to do this and I guess the only way for me to find out is to get into deformation later. The good thing about a Poleless model is that you can select an Edge's EdgeLoop and it will run all the way from start to finish, nothing will be in

its way (No poles).

Note: Don't try this in Blender

A Demonstration

Here is a very short and powerful demonstration before I get to the actual Technique (next post).
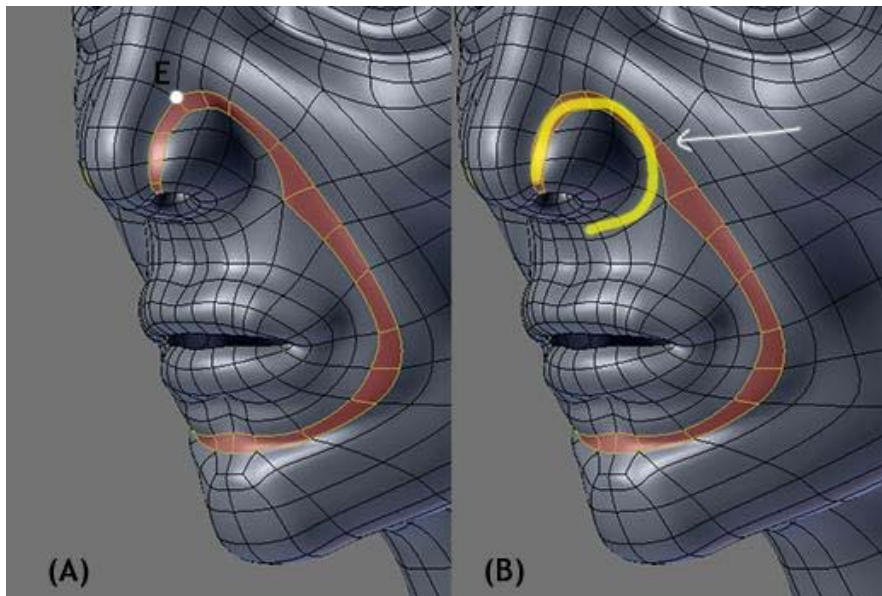
Take a look at (A) and what you'll see is the Loop I created on purpose. I want that Loop there but I also want another one, look at (B)-Yellow Highlight. From what we know, 2 Es on the same lane will create a circular flow and so I put a pole as pointed by the White Arrow.
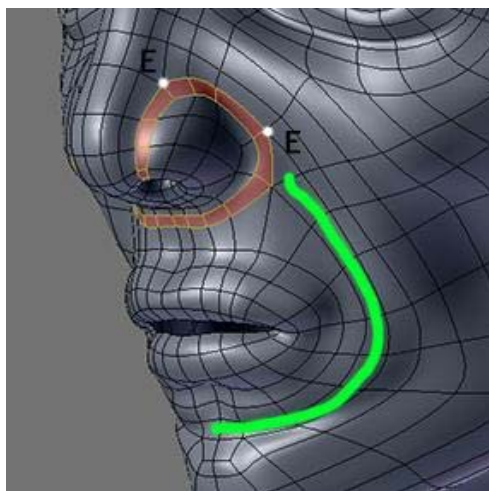
Now I have it! BUT there is a problem. Look closely and you'll see that the original flow got broken (green) so the question is: How do I create a secondary(B) flow while keeping the Primary(A)? The trick is to think one step ahead.

One flow cannot go in both directions! You cannot have one flow that go LEFT **AND** RIGHT. To do that you must split the main flow into two.
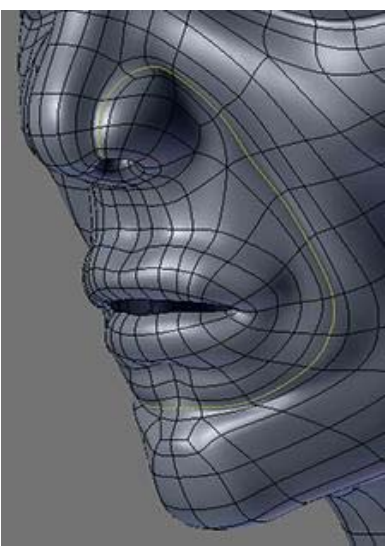
So that one is reserved for the main flow while the second one is for, whatever you want.
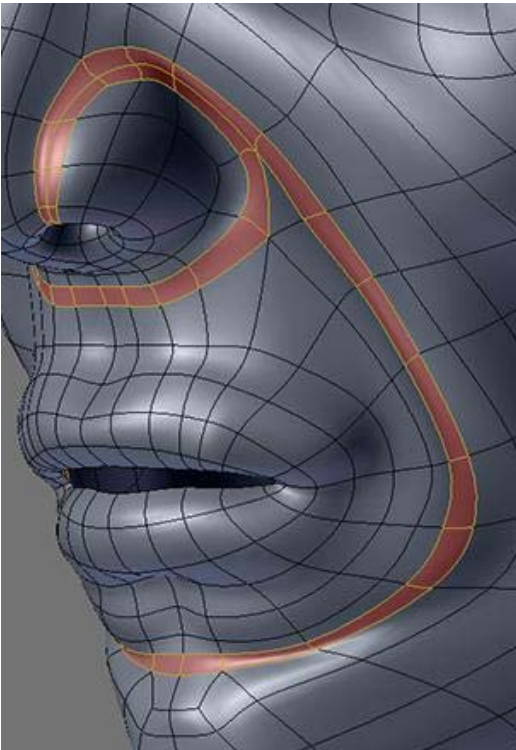
Instead of splitting it into two I made 2 fills which gave me 3 flow.
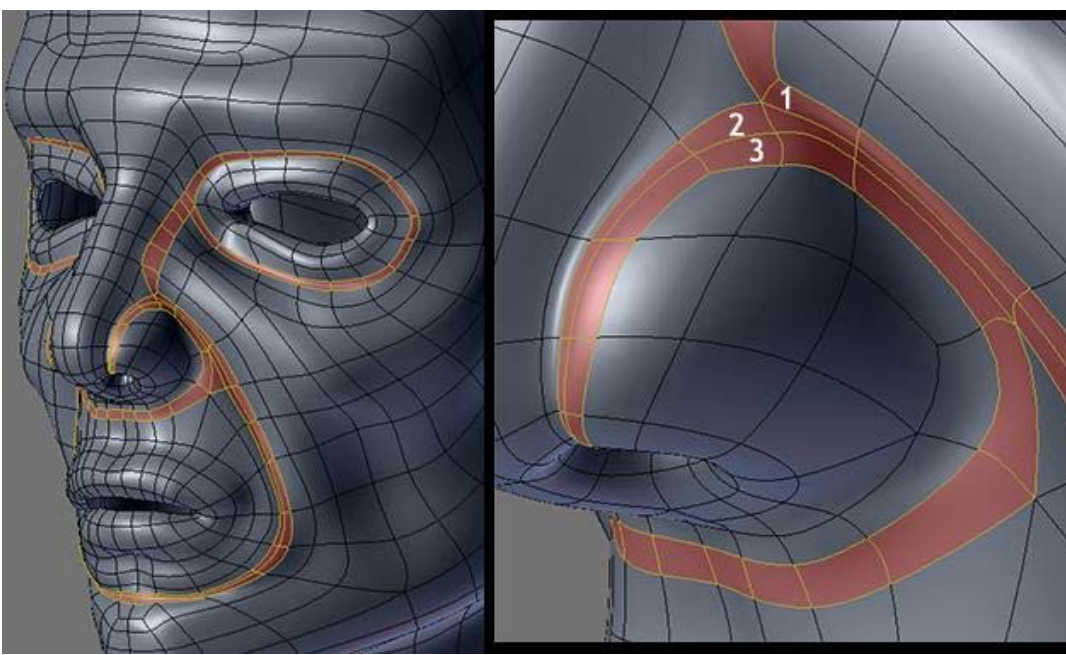
As you can see, there are no guesswork here.

Quote:
  Any chance of a look back there?
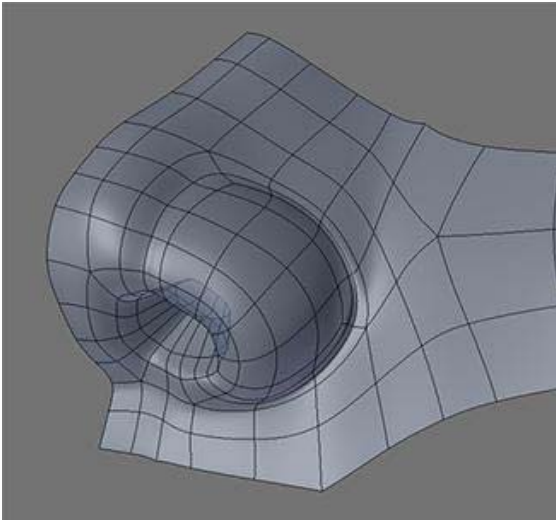
modeling the nose is easy with Poly-by-Poly and for a box I still haven't figured out a logical way yet. If you're looking for the best topo for the nose this image is not it. There are better flows for the nose out there and I'll get to Toontje's post later.

Quote:

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#15
04-24-2006, 03:52 PM

Toontje

Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 46

I feel like I'm Hijacking this thread😀
Someartist, you're explaination is gold!
I was also looking at the workings of edge loops and pole at more atomic level and I like to explain what I found about using the "spin edge" or "spin quad" command.

I don't know if Spin Edge is available for all packages. I know for a fact that you can perform a spin edge in Blender and Lightwave.

If you have a grid and you perform a spinedge somewhere, 2 N poles and 2 E poles will be produced. It seems that in normal circumstances the number of E-poles is equal to the number of N-poles.
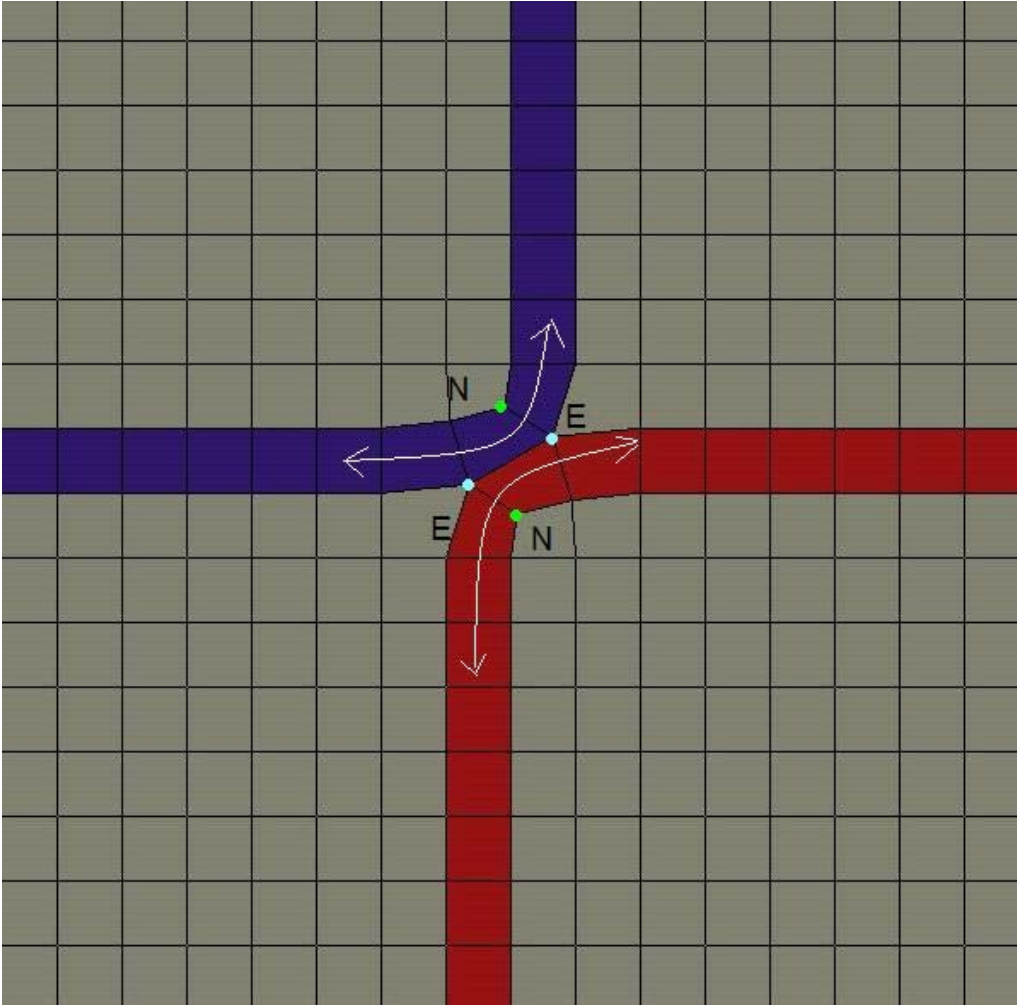
As you can see, after a spin, you are left with 2 loops like railroad tracks opposing eachother. I maybe wrong here, but I found that you can follow the loops better if you look at the N-poles instead of the E-poles. You see in the picture above that the edge loops get bent at the N-poles.

The cool thing about the spin egde command is that you can bend the loops anyway you like. One major drawback is that each spin edge spawns a new loop.
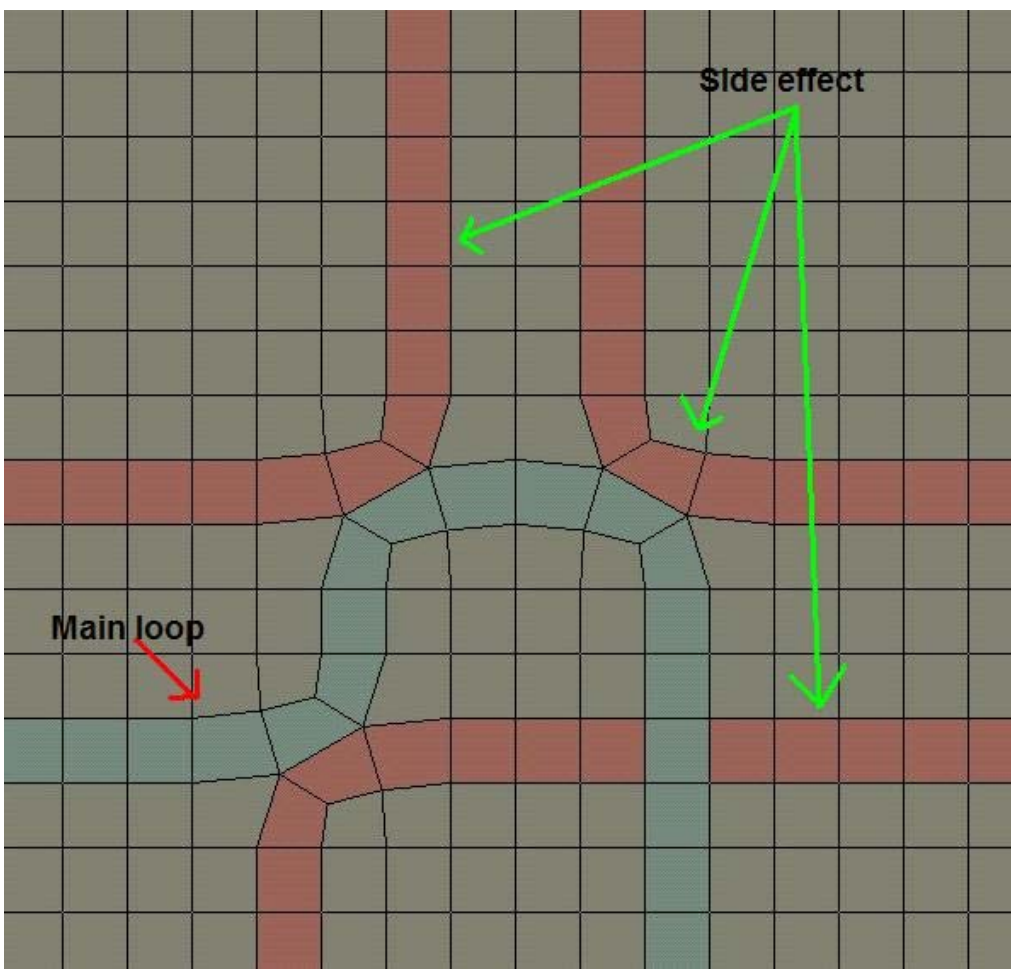
As you can see that if you intent to use spin edge to create loops, you will get this rather nasty side effect.

But you can use spinquands in situations to eleminate poles (just reverse the procedure above by spinning the edge in the oppisite direction) or to correct edge flow, which I will explain in a later stadium.

Remember the simple extrusion that leads to a closed loop? Well, you can make a closed loop too with edge spin and judge for yourself how much it differs from the extrusion method:
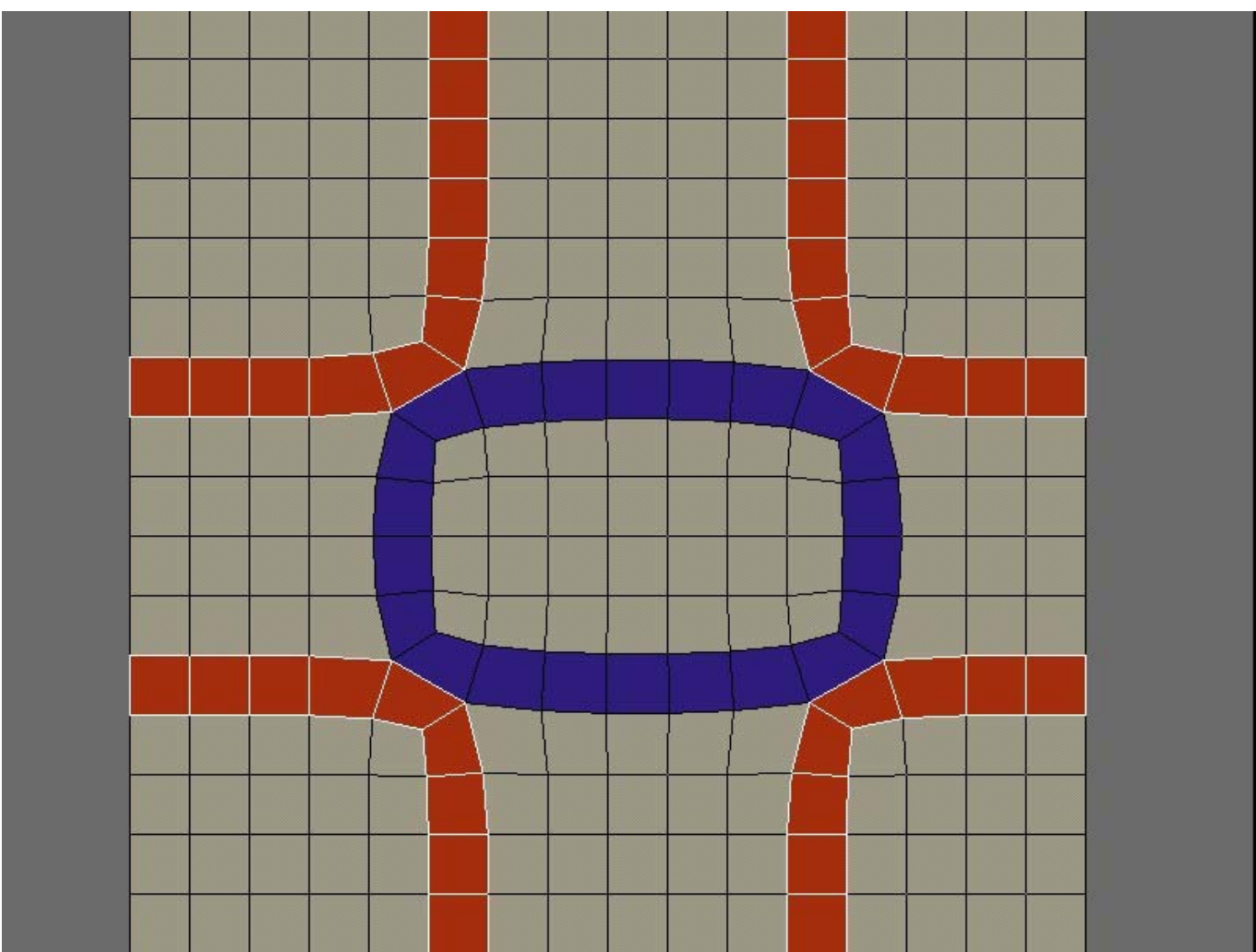
Here you have a closed edgeloop, but with side loops bordering its corners.

On a final note, you can collapse those side loops thus elliminating one N- and E-pole also like this:

I deleted the edgeloop in the lower right corner by collapsing it. In Blender you should be able to delete this loop, but I get an error saying that it is intersecting itself (must be a bug, because it clearly does not intersect itself). So I merged the verts one at a time. Maybe it is possible to elleminate poles in general by collapsing (unwanted) edgeloops? I'll have to experiment a little to find out if this is true for all situations.

I guess the moral of the story is: Beware of spin edge.... for now.

Last edited by Toontje : 04-24-2006 at 04:00 PM.

Quote:

Toontje

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#**16**

Quote:

I feel like I'm Hijacking this thread

Hijack means "Contribution" and you have just turned yourself into a 3d Organic Scientist, good for this thread. I'll get back to the topic later.

Quote:

we really should stop refering to face loops as edge loops... face loops are edge rings converted to faces

Somehow we (as a whole) need to come up with a clearer explanation for those that are starting out.
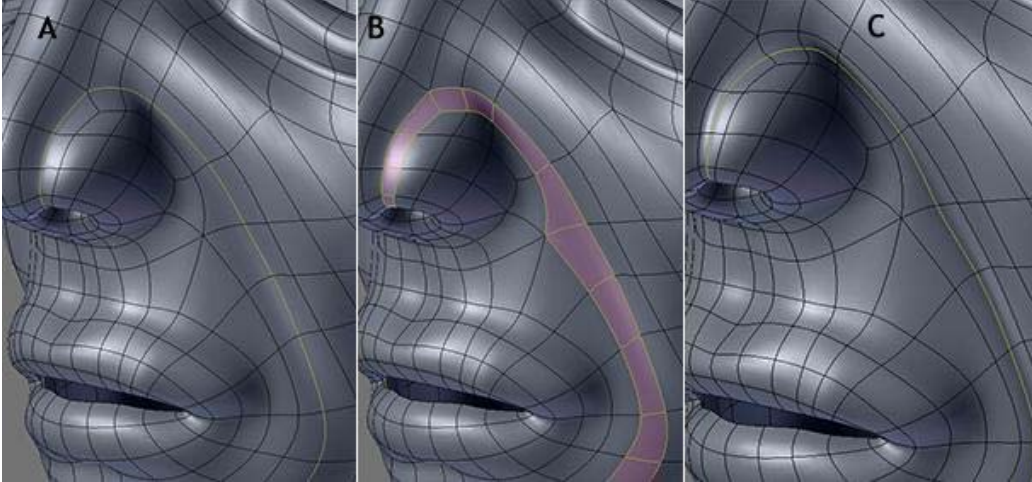
Which one is really edgeloop? A, B or C. The majority believe that B is a better example of EdgeLoop.

Redefining Edgeloop can be tricky because of the context. For example, a passionate Organic modeler might say that Edgeloop is "MuscleLoop"! If this organic modeler spread this idea then it will be a problem when you start to model trees or Machines since they are not Organic so you can't really say "MuscleLoop" when you're modeling a Building since buildings don't have muscle.

Now if you use SUBD algo that gives no pole then (A) in the image above would be a true Edgeloop since edgeloop in a poleless model would run from start to finish but when you use SUBD algo that gives Pole then (A) would not be a true edgeloop anymore since a pole would stop it completely. To pass the pole is to use the Ring as Loop and Pole would not stop it as seen in (B). The problem with (B) then is Ngon, having Ngon in (B) would stop that PolyLoop whereas having a Pole in (A) would stop that EdgeLoop. So to go pass all the Ngons/Poles is to go with (C) *which is inside a PolyLoop(B)*.

Since the Edgeloop inside (C) is actually inside a PolyLoop does that not make (B) a better definition of an EdgeLoop? I know that an Ngon would stop that Loop but we all know that Ngons are bad when it comes to PolyLoop modeling so (B) fits the concept perfectly. By choosing B as the concept we can make this concept even better with the Key and Fill. If we choose to go with A or C then the Key/FIll would be gone and learning modeling would be difficult.

Some people prefer to listen to Programmers because they are the one that coded the code but we must keep in mind that programmers are not artists and vice-versa. It's all in the context and we should pick one that makes learning easy! Muscles are not thin lines, they are thick and (B) would be the concept I go with.

If we choose to leave everything the way they are then we can use clever concepts when we are referring to them. For example, if I were referring to (B) I would say: PolyLoop. (C) would be EdgeLoop and (A) would be EdgeCurve.

Last edited by SomeArtist : 04-24-2006 at 08:04 PM.

Quote:

SomeArtist

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[Toontje]

Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 46

⬤ Rip Mesh

Hello,

Today I'll be talking about mesh ripping. I don't know what the command should be called, or if there is a similar command in another package than Blender. If anyone has a better name for it, I'm interested.

So, what's up? The tools that I'm explaining here are tools that have an effect on the topology because they produce poles. I didn't quiete master the ins and out of this technique, but let me present to you what I found out so far.

What is mesh ripping? With this tool (Vkey for Blender), you rip the mesh open by pulling at a vertex. In Blender you should fill the hole it produces yourself.
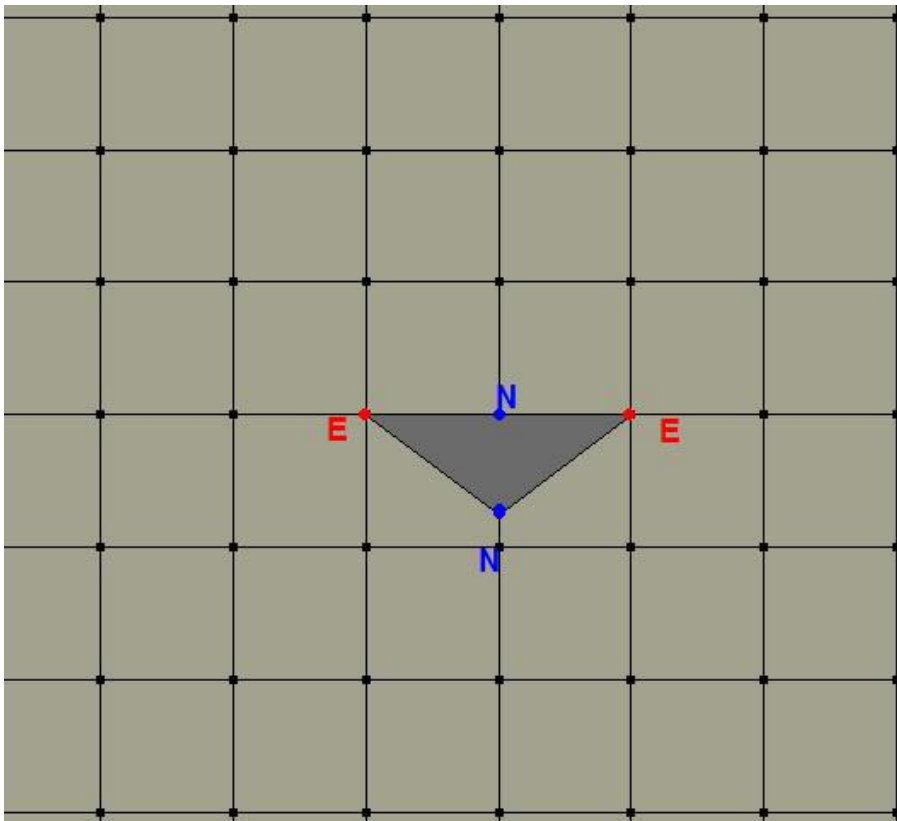
The mesh above was ripped open at the upper N-pole. After that you may want to fill the resulting hole. In these scenarios I will fill the hole.
So, like spin edge, rip mesh produces a pair of N-poles and E-poles. Like I said before, the direction of the faceloop (I agree on the terminology too) is determend by the N-pole.

The resulting hole stands out like a diamond in the mesh. If you encounter such situations, and you a meaning to eliminate poles, just merge those N-poles together to get rid of all the neighbourhing poles (thus effectively reversing the mesh rip).

After a spin edge, you are left with pair of poles opposing eachother diagonaly. With mesh rip the poles are opposing verticaly or horizontaly.

So far I have found these uses for mesh rip (topology wise that is):
1) Moving E-poles around (YES😬)
2) Creating C-loops

Because of the lack of Ngons support in Blender, you have to manualy complement the mesh ripping operation by using the cut tool and merge triangles into quads. But nevertheless, mesh rip is a very powerful tool.
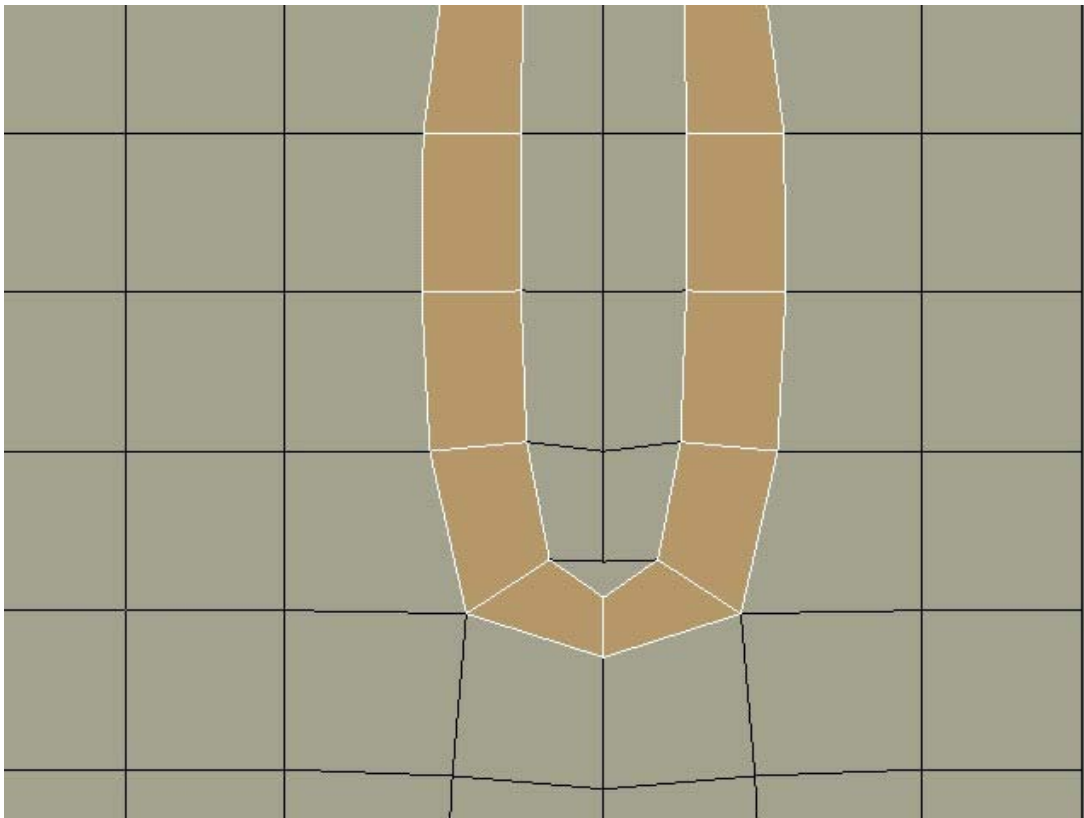
First, **Creating C-loops:**

The rip mesh tool is very flexible in conjuction with the knife tool. Depending on the method, you are left with a single C-loop, or with a mirror pair of C-loops.

Creating a single loop:
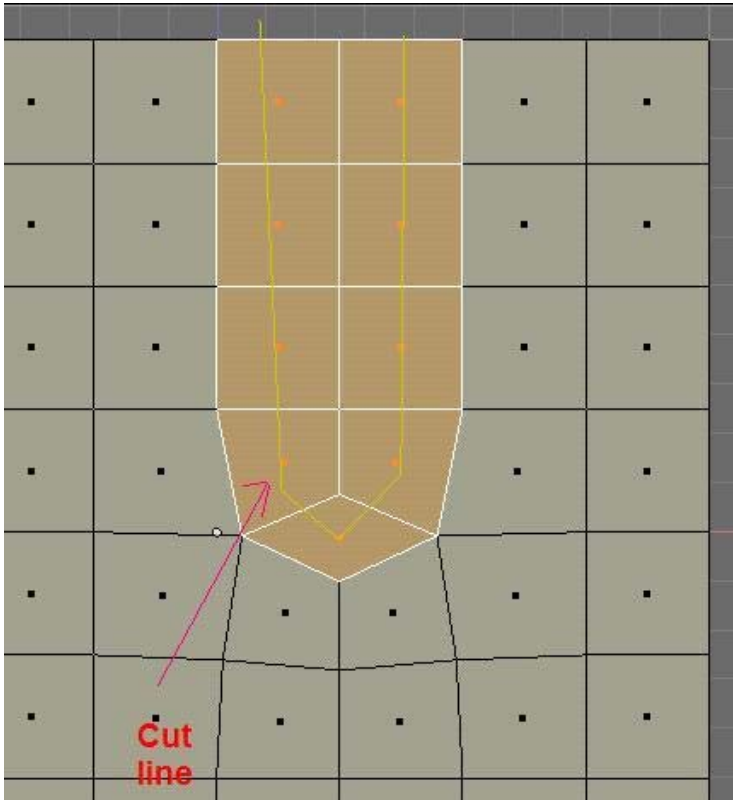
And after the cut:

This was a very minimalistic loop because I ripped at only one vertex.

Last edited by Toontje : 04-25-2006 at 07:00 PM.

Quote:

#**22**
04-25-2006, 08:23 PM

If you want to make a much wider loop, you must rip all the vertices in a row. You need to use the knife tool to obtain the face loop. Depending of how you cut the mesh, the results will vary.

To obtain a single broader face loop:
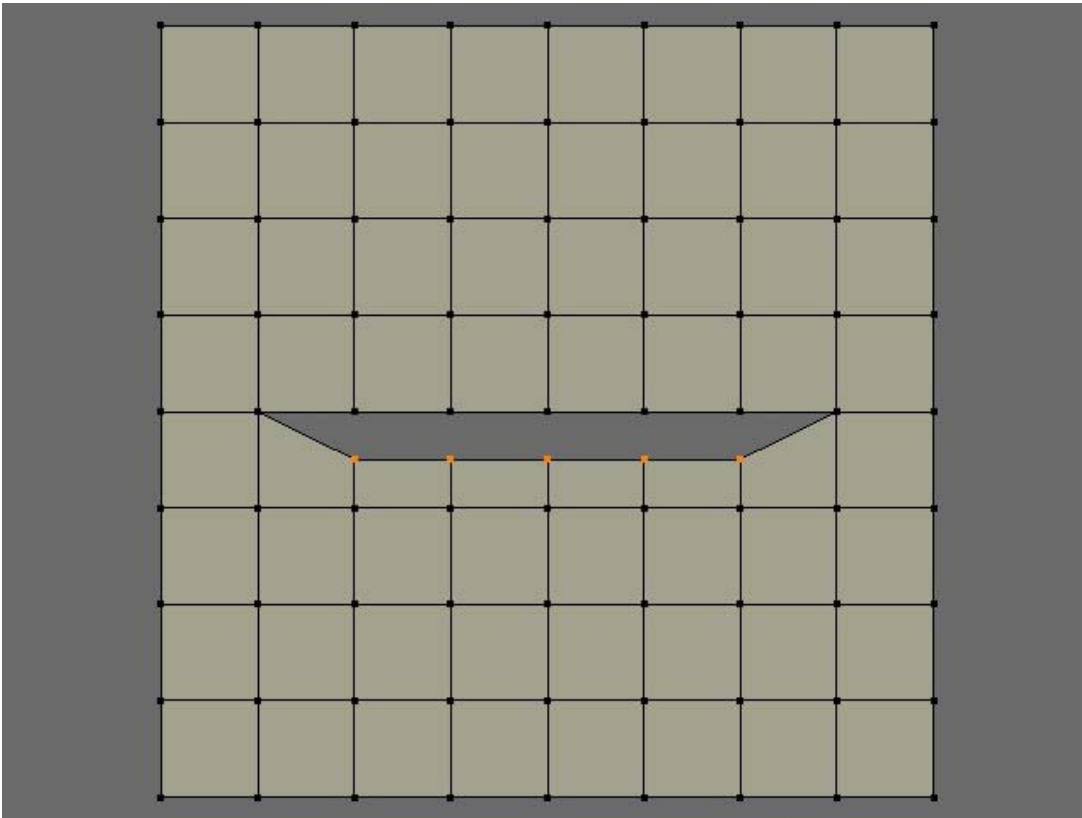
Here I'll cut before I fill the hole, else there will be triangles in the corners
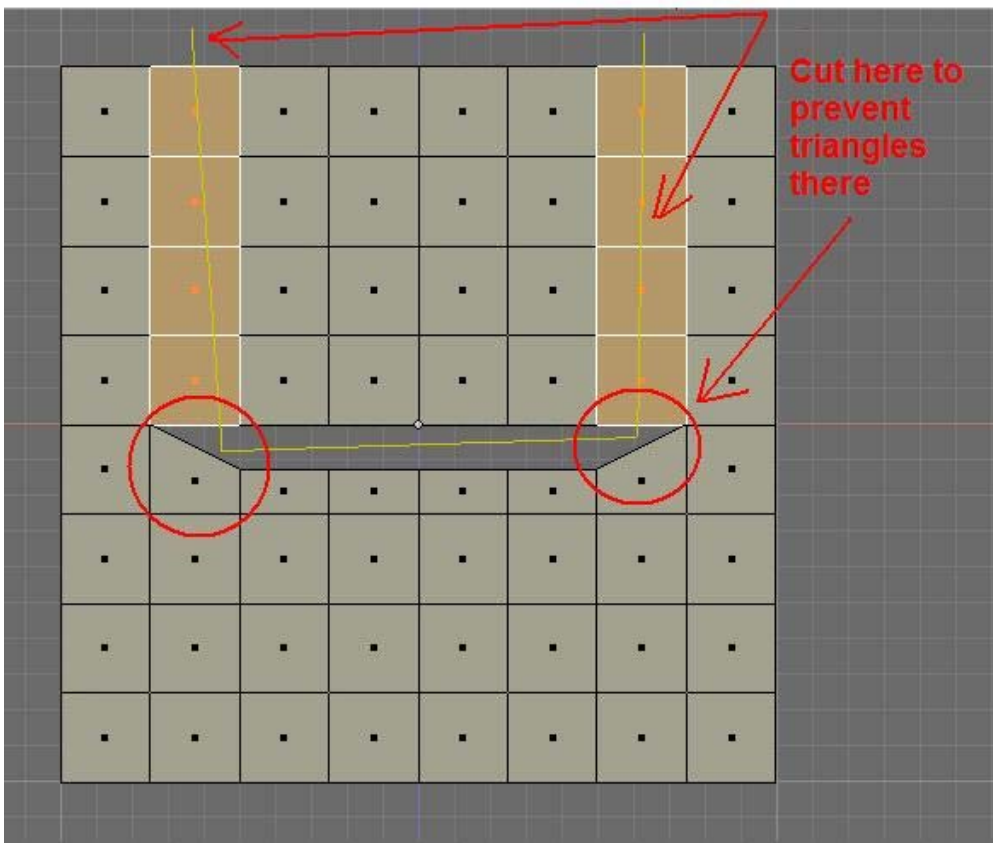
And then after filling the holes and cutting (and smoothing) you are left with one C-loop (by the way: I assume that C-loop means C shaped loop and not closed loop).
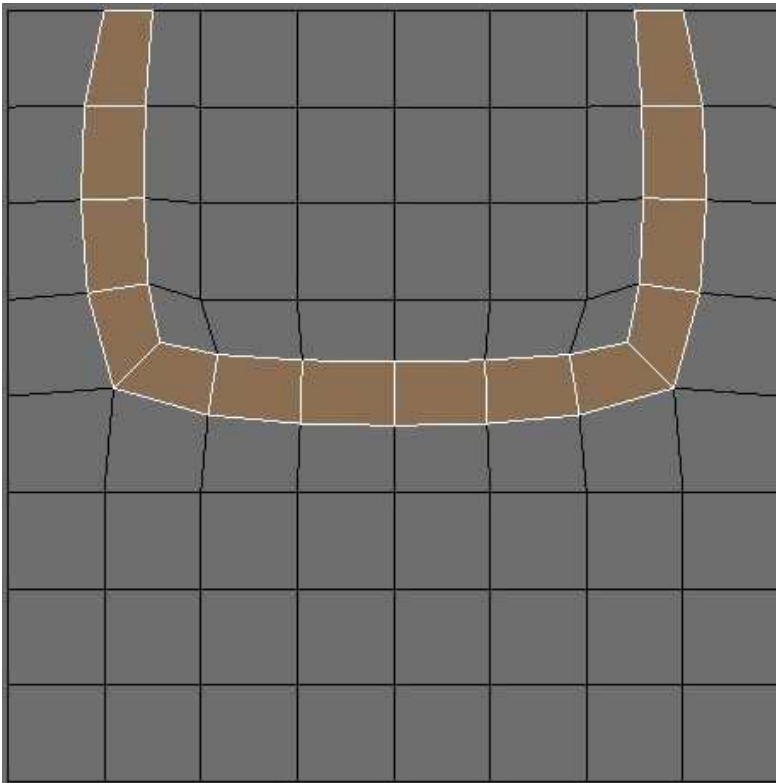
There is a number of ways to make a number of wacky face loops/ edge loops with this method, but i suggest to keep it simple because simplicity and predictability is the name of the game here.

Lets try to make a a closed loop like in a extrusion:

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#**23**
04-26-2006, 01:07 PM

Layer01

Quote:

Originally Posted by **Wasamonkey**
besides the main work is loop, edge poly/face simply tell you what kind
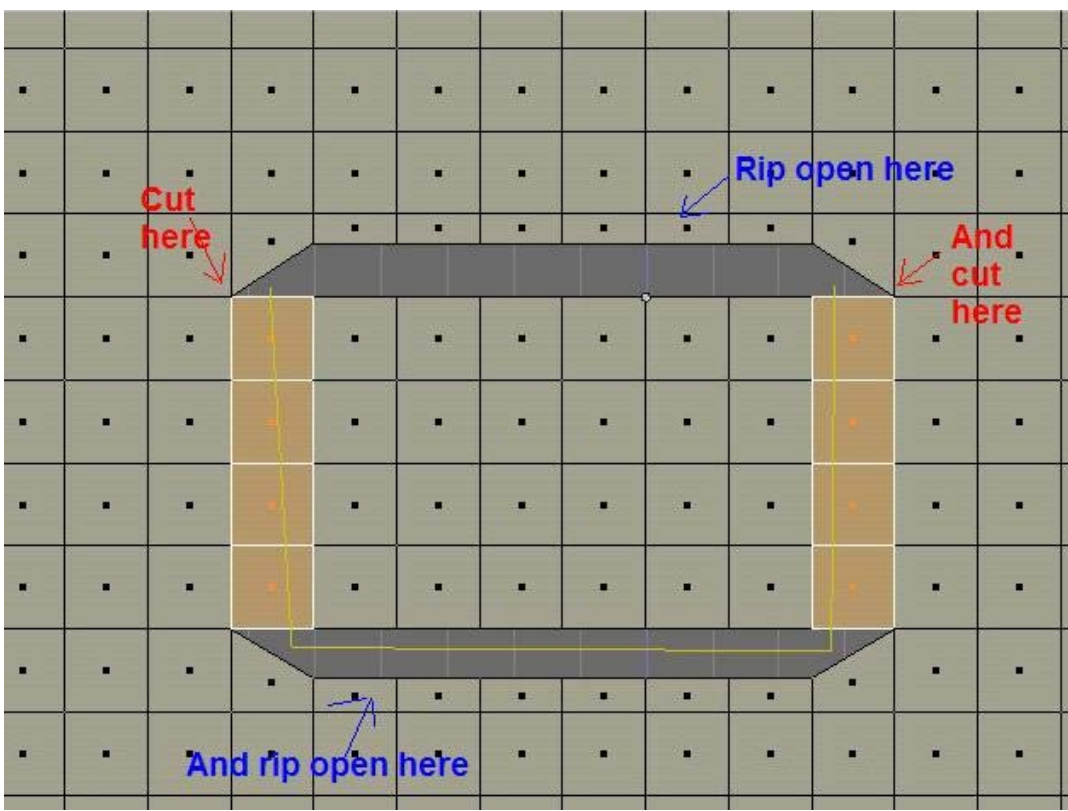so for simplicity for new users wouldnt it be best to stick with the simplist description

quoted in agreement.

so let me see if i've got this right, we'd then have (using SomeArtists a,b and c pics as an example)
(a) still not sure what to call this one, something to do with poles would seem to make sense, in terms of identifying it from (c)
(b) faceloop/polyloop
(c) edgeloop

E-poles = five edges meeting at one point/vertex
N-poles = three edges meeting at one point/vertex

Keycuts (a)
and fillcuts (c)

i can't think of any other terms being thrown around atm, but it'd probably be helpfull to have these all written down in one place, rather than having to dig through multiple threads to see whats going on.
a though on (a), could it maybe be considered a Keyloop? thus differentiating it from (c) an edgeloop..? maybe thats just over complicating it all 😊

Tootje: nice posts, i think that term is called break in other apps (at least the ones i know)

Layer01

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#24
04-26-2006, 04:37 PM

Toontje
Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 46

⬤ **Continued**

Thanks Layer for the comments. Regarding "rip", I'll call it "break" from now on.

My posts are based on non NGon workflow only. I don't have any real experience with NGon's, so don't hold that against me. However I think that every package must be able to deal with tris quads only....

Let's continue where we left of:

After the last operation you are left with this:
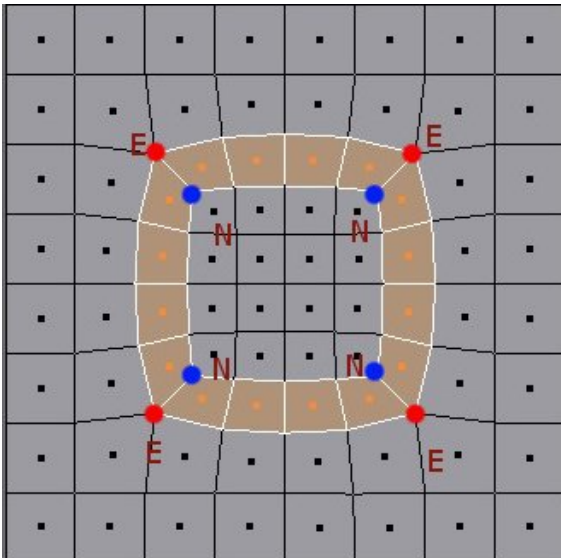
Wich is identical to an extrude operation of course. So let us keep in our back of our mind that the break command and the extrude command is somehow related.

Now then, there are a lot of ways to finish of the break mesh operation with the knife tool, each producing its own unique outcome.

Here I will demostrate the easiest way to use the knife tool, but it produces a mirror loop. This effect may or may not be desirable depending on the situation.

After a break, fill the holes. You are left with 2 tris in each corner. Cut through this so the tris are doubled, which means you can join them back to form quads (*).
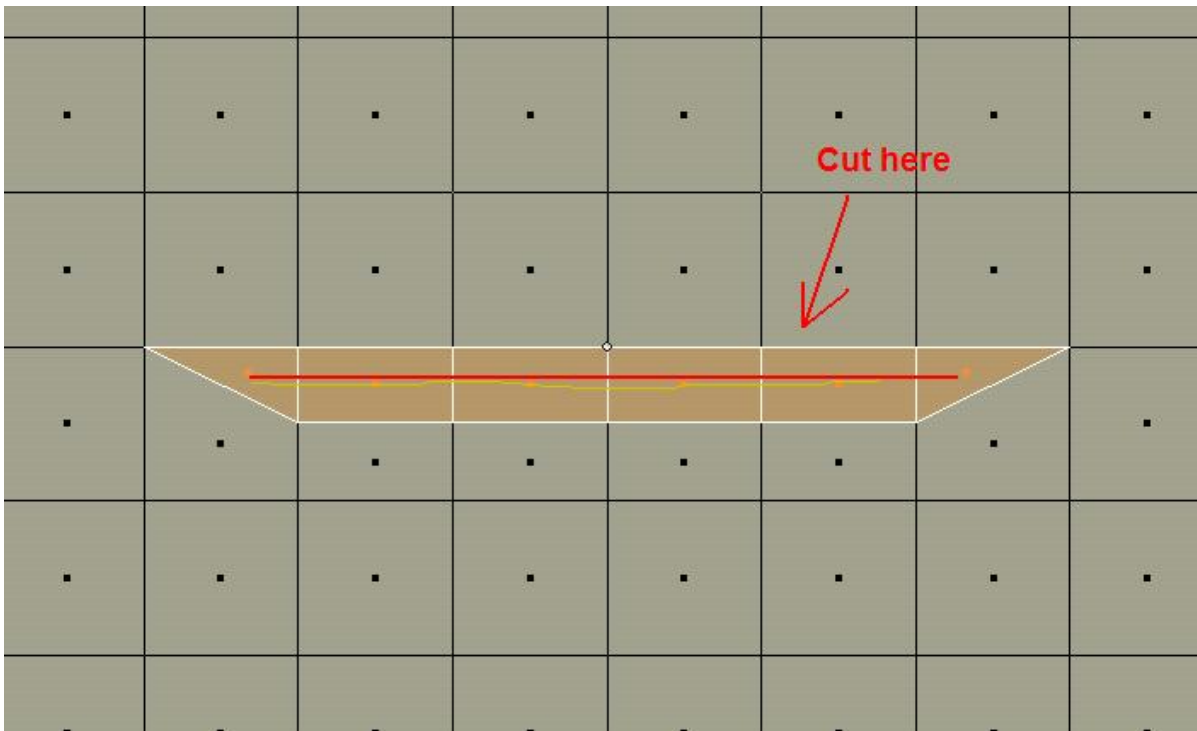
And you are left with two overlapping C-loops:
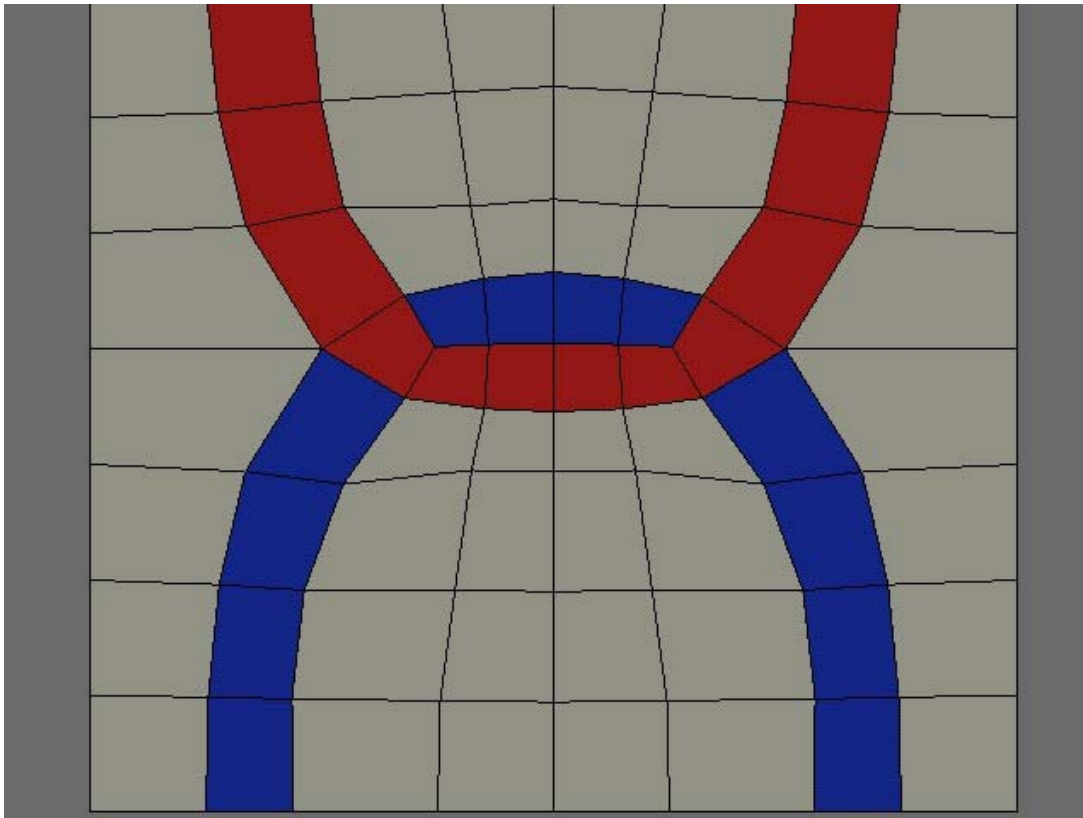
I've experimented a little with ways to complete the loop after a break, but the other results were a little funky, like one c-loop being overlapped by two opposing c-loops.

You might think that a break is the oppisite of a vertex merge, but it isn't. In an all quad mesh, a vertex merge can't be undone by a break.

But what a break does is removing one edge from a vertex! But a beak will add an extra edge on both its corners. Armed with that knowlegde I will show you tomorow how to move poles around. Essentialy you are adding an edge to the N-pole making a 4 edged vertex (normal quad) and you are removing an edge from the E-pole, and at the same time you are adding an edge to a vertex outside the loop. It sounds like a mouth full, but is just 2 simple actions.

*: For those "I hate tris" folks out there, that's a sure way to eliminate tris, but it could leave you with a jumble of unwanted edge loops. Best is to cut through the shortest route.

Last edited by Toontje : 04-26-2006 at 11:56 PM.
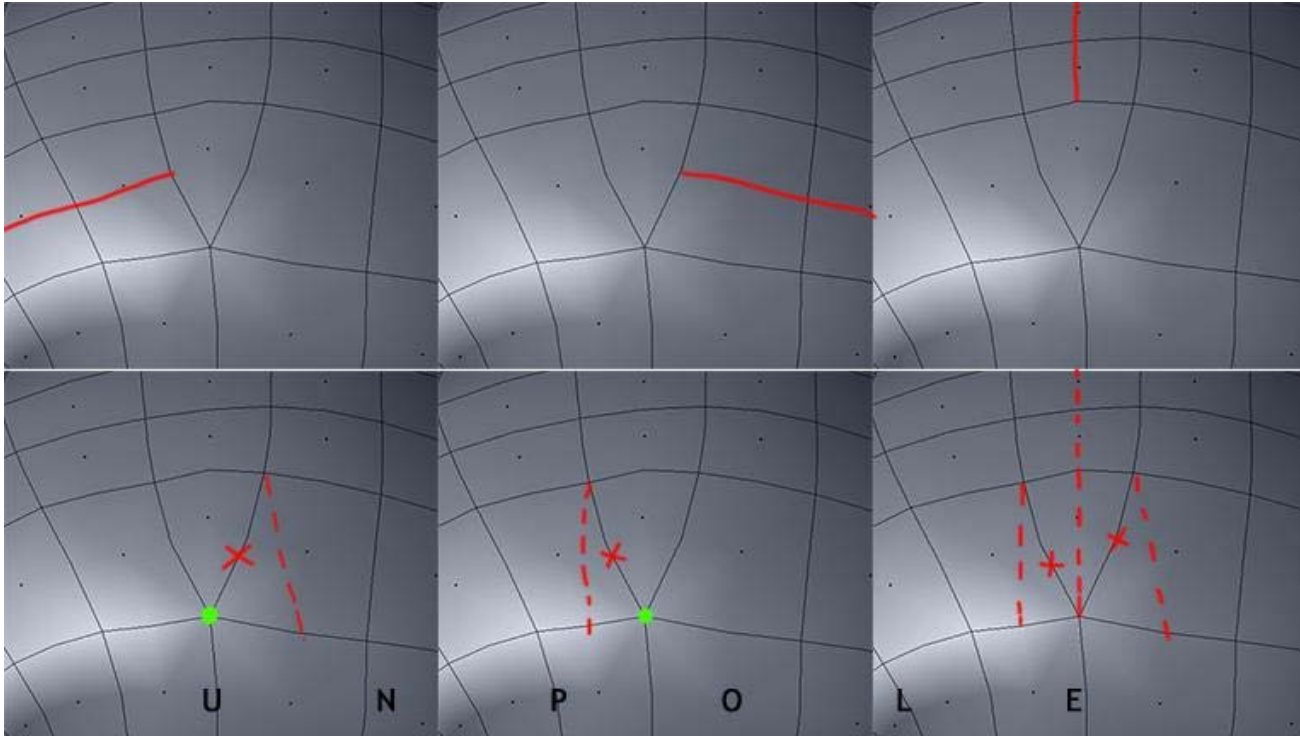

SomeArtist

Organic modeler

Join Date: Jan 2006
Posts: 67

For this post I'm going to talk about the technique since people are waiting for it then later I'll respond to the posts before this one.

UnPole

Earlier in my first post I showed you the Triangle image and told you that it held the key to mastering Sub-D modeling.

The top row is what you have been living with and the bottom row is the UnPole technique. Combine this technique with Spin Quad (plus the knowledge on Poles) and you have just mastered SUB-D modeling! Here is another way to solve the Triangle.
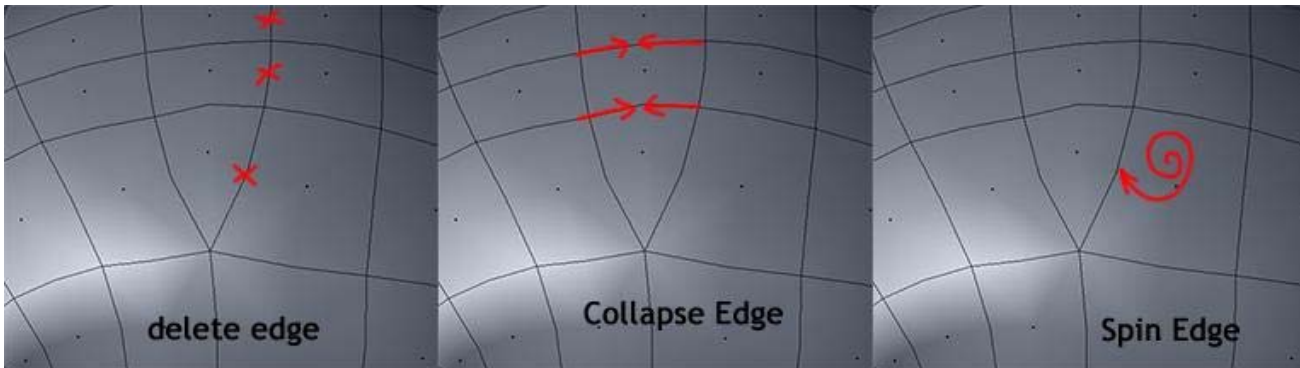

Keep in mind that I did not invent any of the above I am only giving it a name and raising awareness (especially the bottom row in the first image). Now that you can solve Triangles you can turn a messy mesh into a good looking mesh! First let's look at the SpinQuad and Unpole.

Note: You need to know the above if you're planning to model in Blender since Blender produces a lot of Triangles.
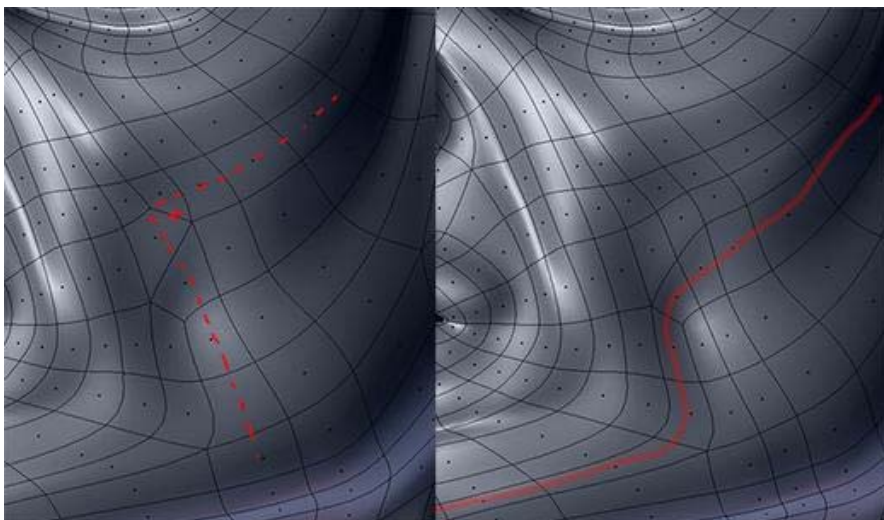
SpinQuad/UnPole

SpinQuad is a very powerful technique that can change a flow in an instance. All you need to do is select two faces and Spin them.
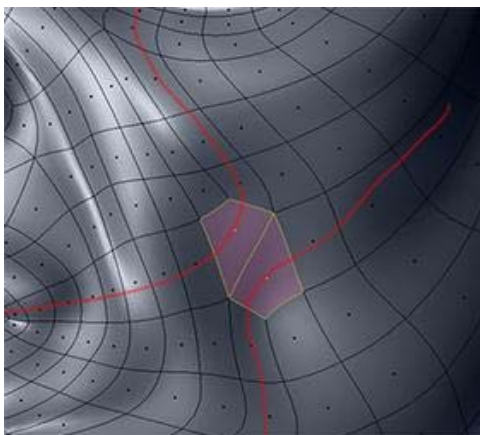
There are two problems to this technique and they are:

1: The mirror effect.
2: The NPole!

These two problems can be solved by unpoling the Npole and once that Npole is gone the rest will be gone.

I look at Unpole as a technique to clean up the mesh (beside shifting poles).

There are two ways to create/change a flow and they are:

1: From a pole perspective
If you want a pole at a specific location then do not use SpinQuad since it's difficult to visualize the result in your mind. By knowing that two Es on the same lane will create a Circular flow, then it's logical to do it from a pole's perspective.

2: From a SpinQuad perspective
Use SpinQuad when you don't think much about Poles. Sometimes it's logical to use SpinQuad over UnPole and vice-versa!

And last you can combine these two together. I'll get into Shifting poles next for now try and open one of your messy meshs and see if you can look at it from a Triangle perspective.

Note: There are 4 images in this post

Quote:

SomeArtist

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#**28**

☐ 04-27-2006, 09:05 PM

Toontje
○
Bachelor/
Ingenieur

○

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 46

Though act to follow. SomeArtist, I feel like one of those small fishes swimming along with the shark.

I will present to you some technique to move poles around. One can be done with the Break command, and the other can be done with the Spin Quad command.

First the break command:

Let us take a standard circular egde loop/ face loop as the starting point.

A break normaly produces 2 E-poles. In this we have to break the mesh (/vertex) at a specific location so you are not introducing an extra E-pole. The logical place to do that is where the N-pole is located at. But not only you'll shift the E-pole, but the N-pole will come along for the ride. But this technique can only be done when there are no 'fill loops' present, in otherwords, the E-pole and N-pole are in direct contact.
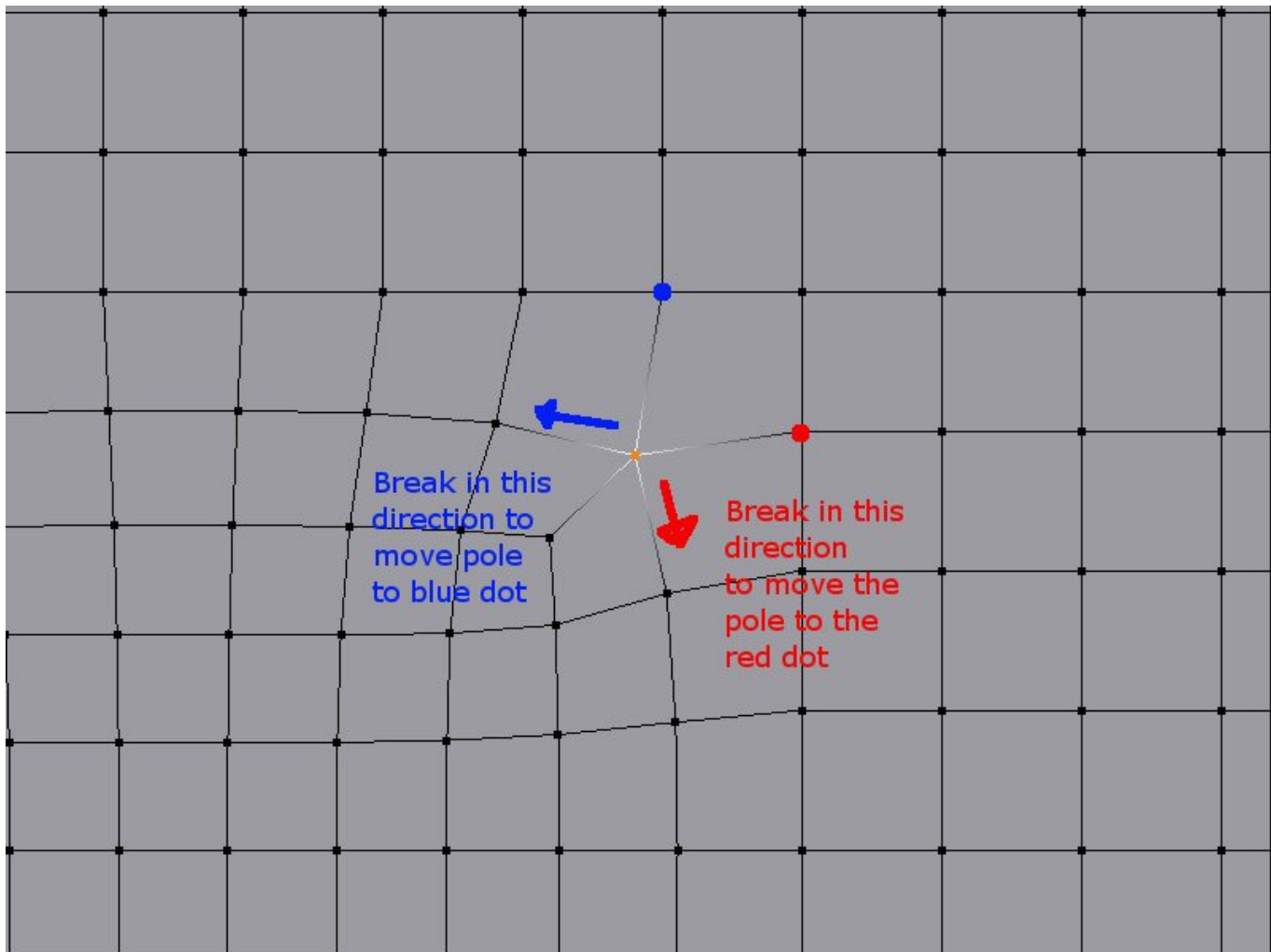
As you can see, E-poles that once was on the same edge loop, are now on different edge loops.
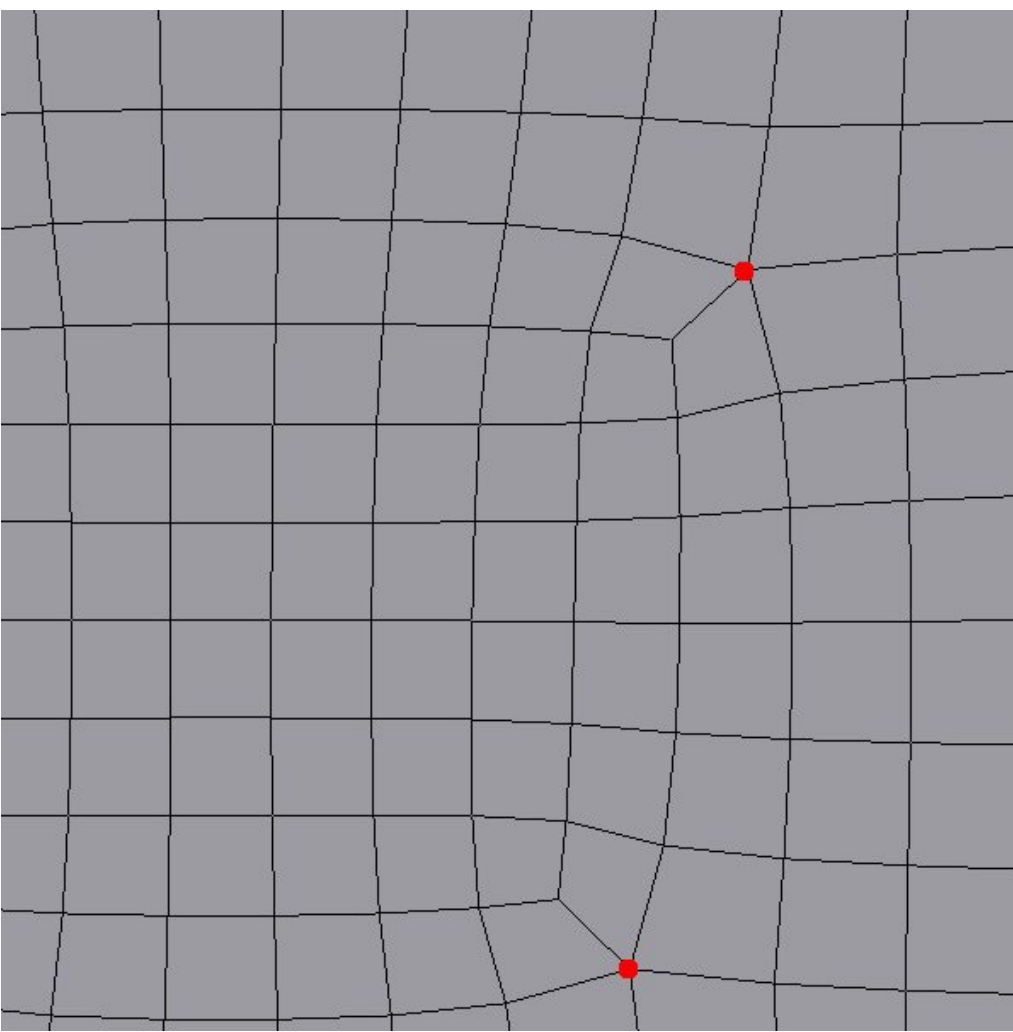
Using Spin Quad:

There is a lot of possibilities here making the spin quad rather flexible. As stated before (I think), the spin quad should be used more as a tweak tool. By moving poles around, you have total control over the flow of the loops. With the spin quad, if you spin an edge that is connected to a N-pole, you'll get a pair of quads that shares two edges. This will look like two tris, but don't be fooled and convert it into a quad.

Let's start from this situation:
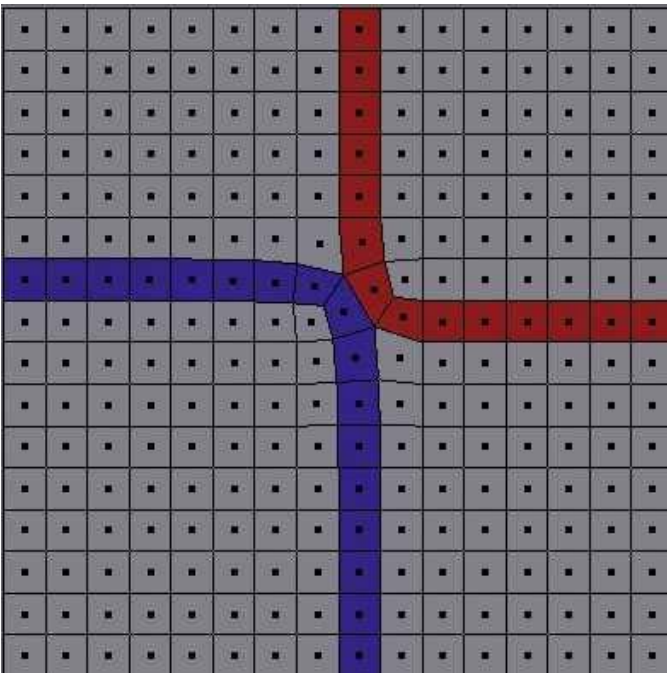
This was achieved by performing a spin quad.

SomeArtist already showed an inginieus method to eliminate one pole by unpoling the N-pole. I guess this can be done for any N-pole. One possible disadvantage is that your mesh will become denser.

In the image above, you have 2 loops that are joined at the hips. Here I shall show how to move the E-pole around and thus effectively seperate these two loops. This method can be repeated to further drift these loops apart.

(continued on next post......

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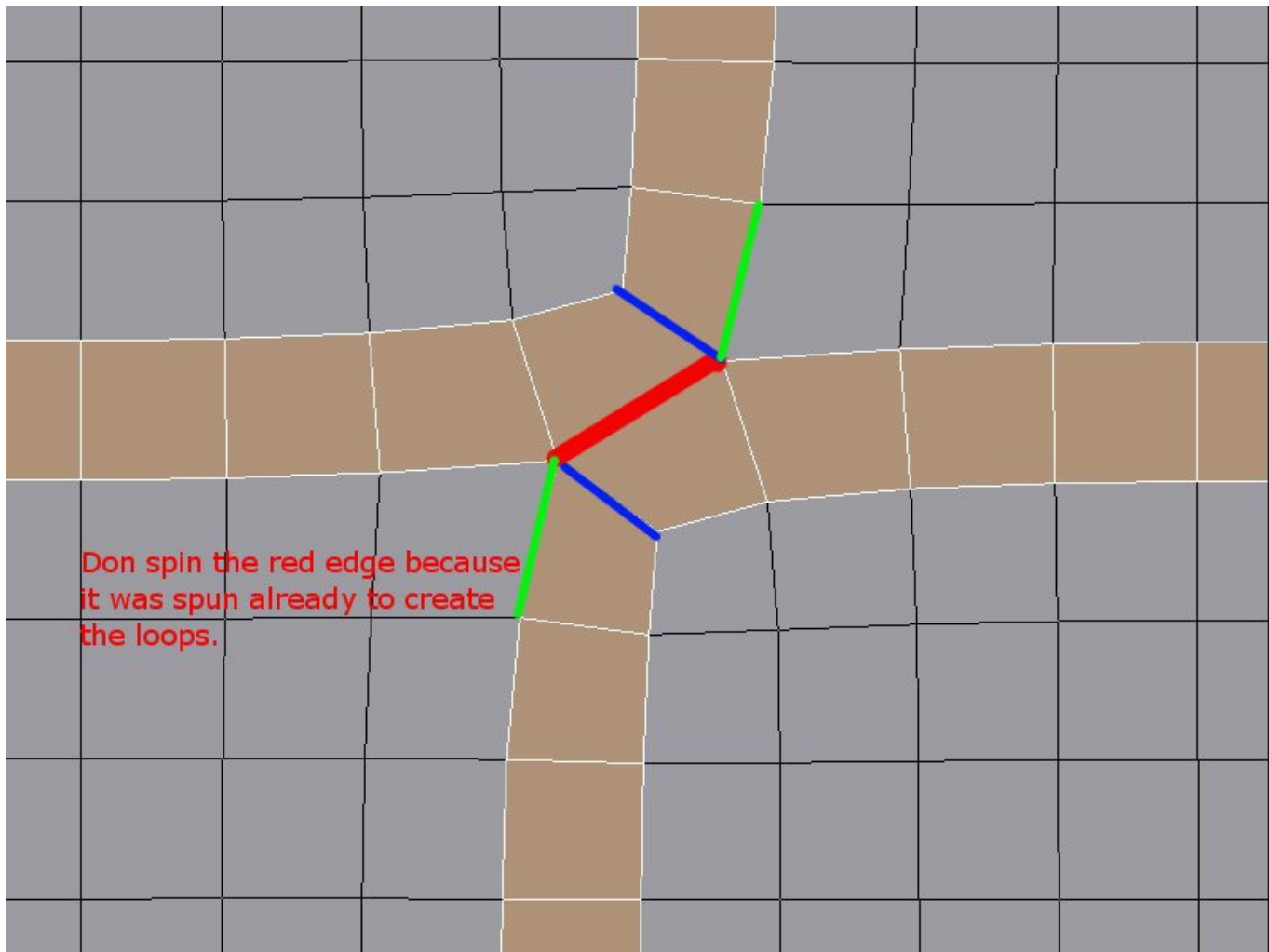
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#29
05-02-2006, 05:02 PM

Toontje
Bachelor/
Ingenieur

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 46

Moving E-poles around through SpinQuad (continued)

Don spin the red edge because it was spun already to create the loops.

In the image above there you can see those two loops that are joined at the hip. To seperate them you can spin the green of blue edges. Don't spin the red edge, otherwise you are just reverting to the original situation (no loops) or if you spin twice both loops will flow in a

oppisite direction.

The green loops are easy. When you spin it, the loop will seperate and drift diagonaly away. You may keep repeating untill the loop is at the end of the mesh. Or you can unpole it or collapse it to get rid of it.
Maybe it is not apperant in which direction you should spin this quad/ edge. Just visualize that you have to spin it so the edge will allign to the horizontal adges outside the loop. So in this scenario you should spin the upper right green edge once counterclockwise and the result is this:
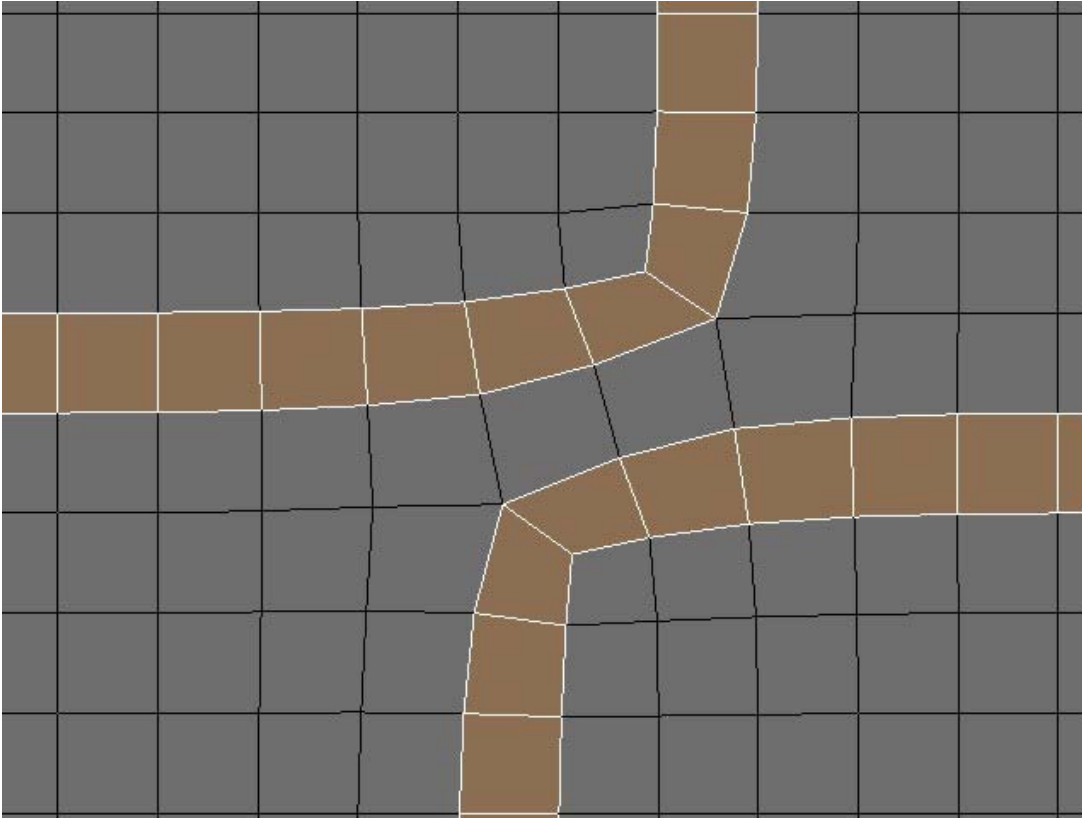
(To be continued)

Last edited by Toontje : 05-02-2006 at 09:19 PM.

Quote:

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#30
05-03-2006, 05:30 PM

SomeArtist

Organic
modeler

Join Date: Jan 2006
Posts: 67

I can actually lose my breath by trying to show you all the combinations so what I'll do is show you the key ideas then from there you can experiment to find out. I might only show you one way but keep in mind that there are many ways! It depends on how you want your mesh to flow and how you look at solving the Triangle.
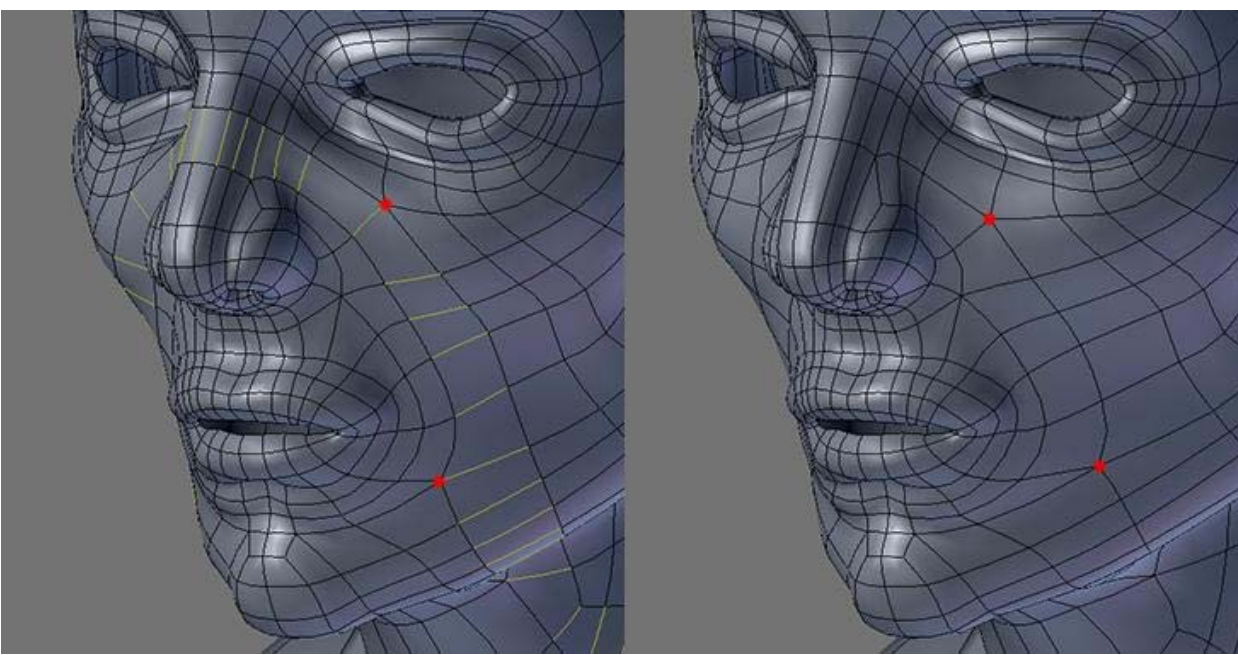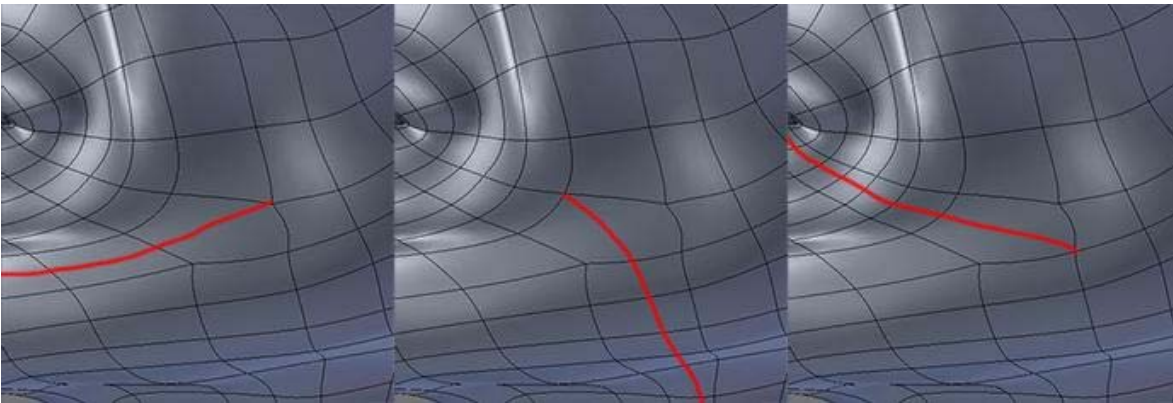
When you want to merge two Es onto the same lane all you need to do is collapse the edges.

Moving the E (Rotating)

An E Pole has 5 edges and all you need to do is take one of the 5 edges and rotate it, that is in theory. In practice what you do is delete it which will remove the E pole and you are left with an
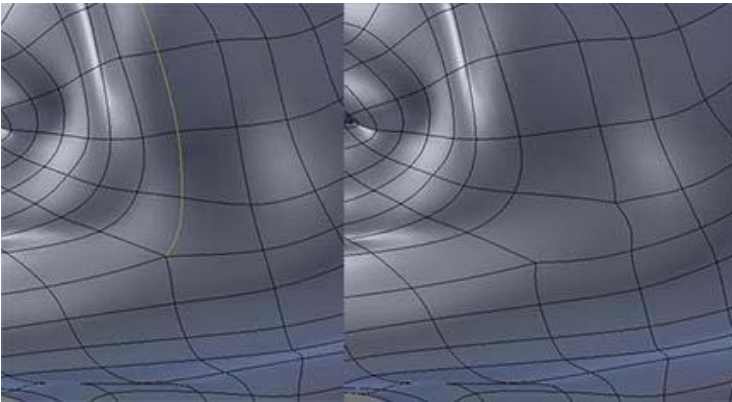
Ngon. Rebuild the Ngon and there you have it...

Triangulate
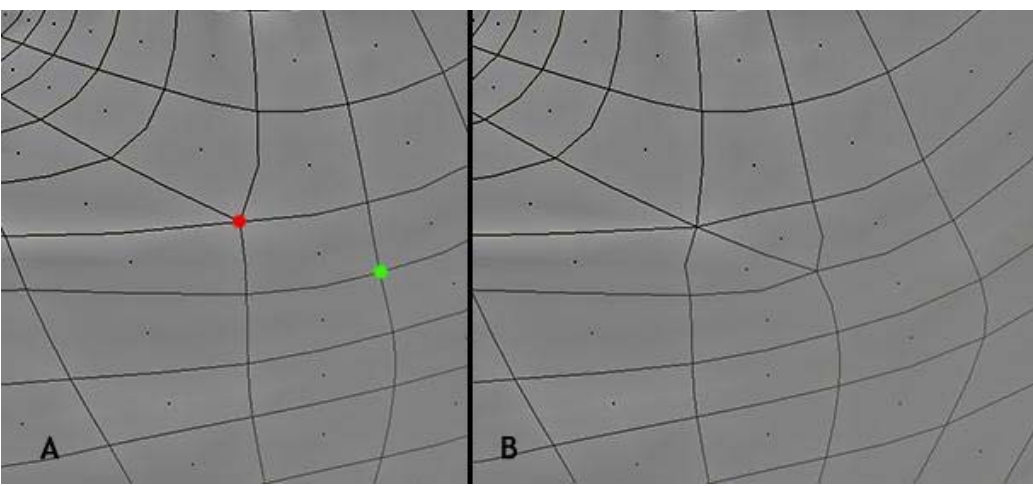
The combinations are endless once you turn a Quad into a Triangle. Look below:

delete edges
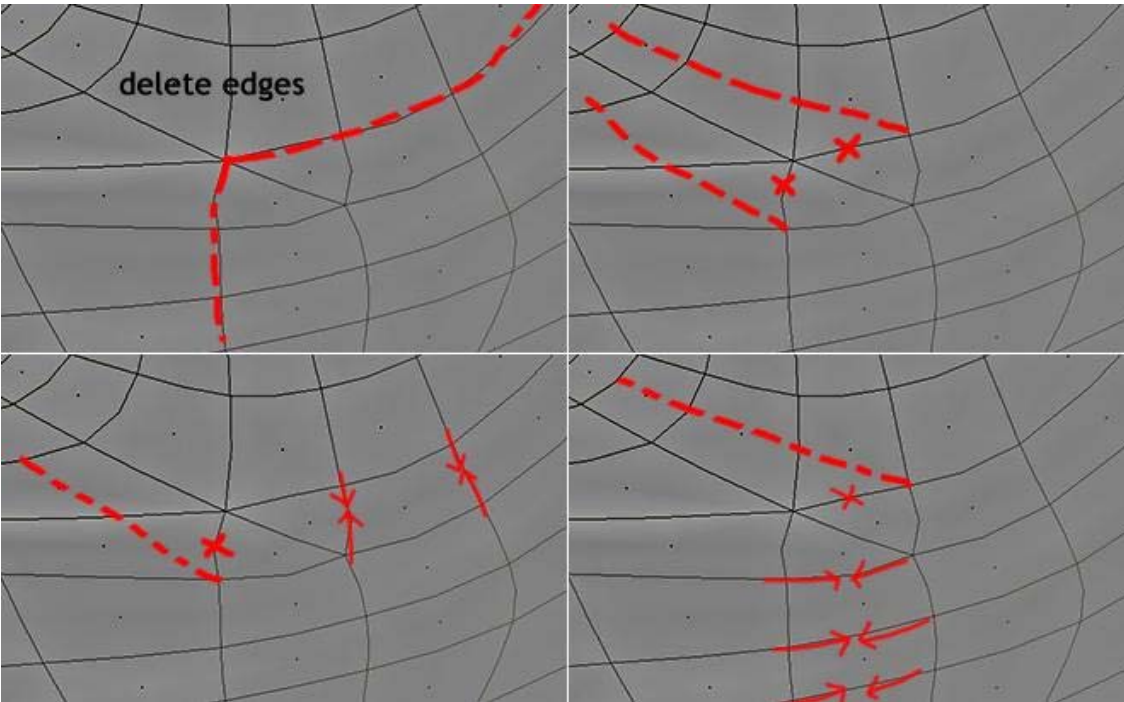
The same key idea can be used in reversed:

Note: There are 8 images for this post

Toontje brought up SpinQuad and there is something interesting in it when you compare it with the Wrinkle technique which is used for wrinkle effect but it can also be used to create flow(s).

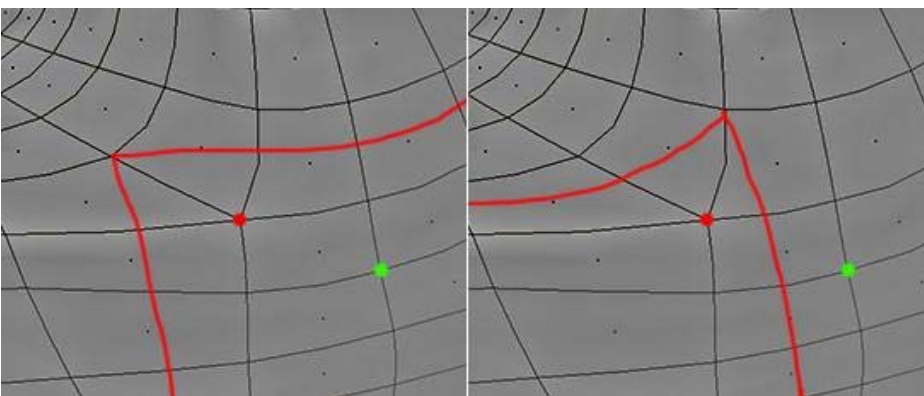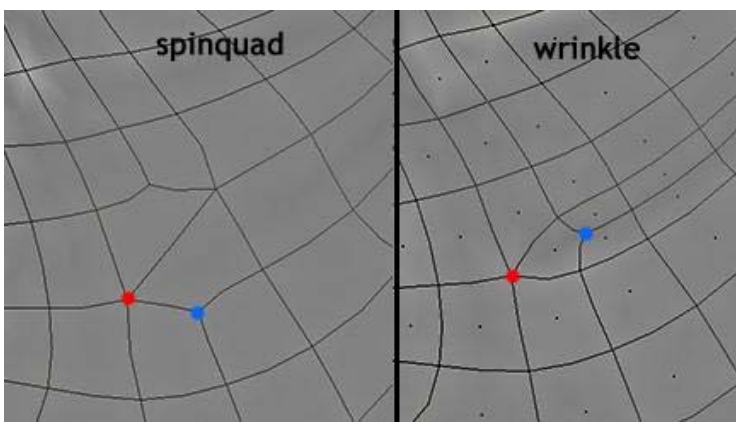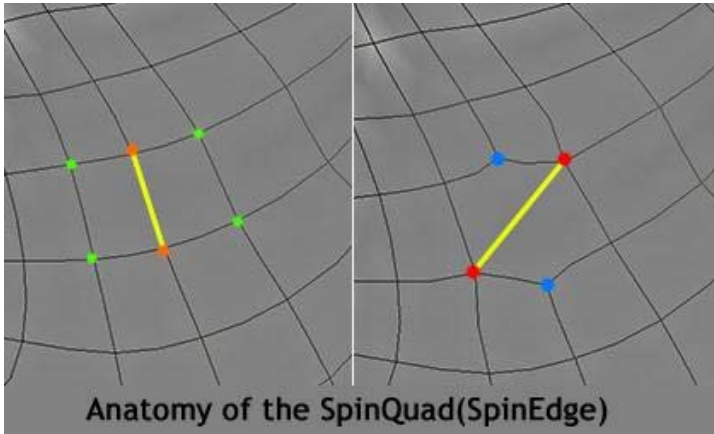The difference is in the poles. Also, earlier I said that the Spin Quad are not logical well, after looking it a little closer I can now say that it's very logical!

Anatomy of the SpinQuad(SpinEdge)

When you about to an spin edge or quads keep in mind that the green dots will be converted to Epole and that the Orange dots will be converted to Npoles.

Quote:

SomeArtist

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The Pole - Page 4 - Subdivision Modeling

Toontje

Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A
Posts: 46

OK now, I will continue with my previous rambling 🙂

In my previous post there is a matter left about the blue edges. This has to be spun COUNTER CLOCKWISE always. The end effect is that the loop drops one position/ row. But in between the spin quad action will look like a mess. Delete the lone vertex. What this realy is, is two quads sharing tw edges. By deleting this vertex, and filling the hole up, you are converting these 2 quads into one quad.

After the spin delete this vertex
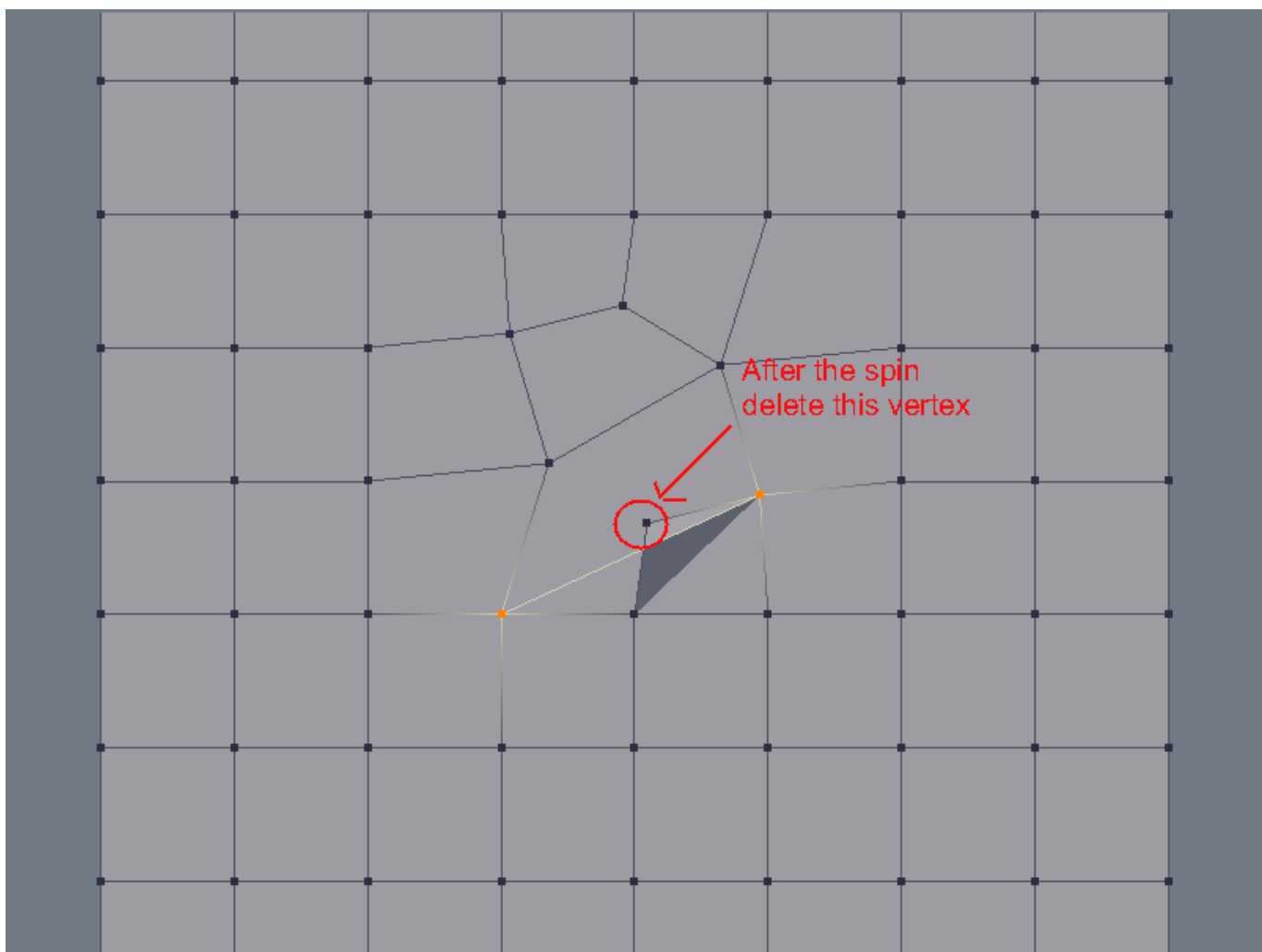
Ofcourse after smoothing and stuff the result will be:
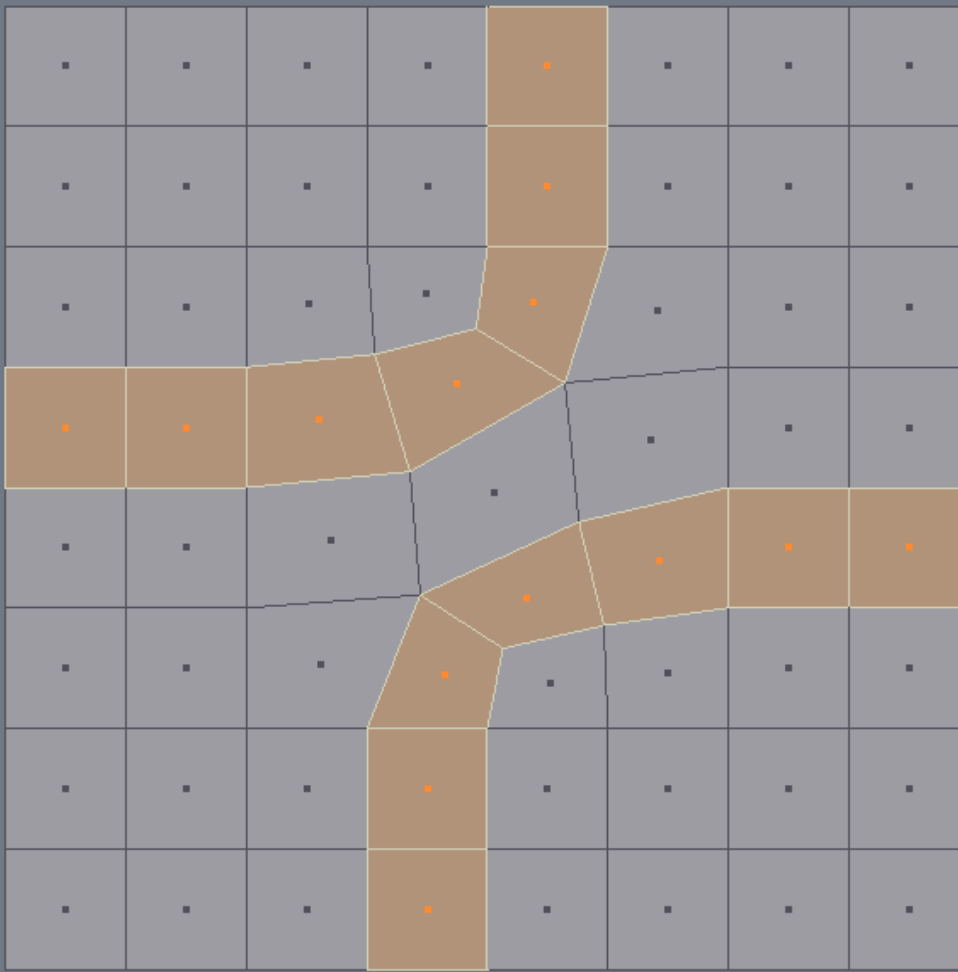
Indeed you might have noticed only a vertical shift. You can shift it verticaly too by spinning another edge. But like SomeArtist said, I can lose my breath explaining all possibilities. As long you get the picture.

Next I'll explain the cut tool. I've discovered that the cut tool gives very unexpected results. You cannot just simply cut away in your mesh and expecting a nice edge loop. But I found a method to correct that using the magical but less understood Spin Quad again. With this method, you are l with a totaly clean face loop that you can use for a number of things like fine detailing (veins and such)

But I'll continue later.....

Quote

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#**32**

05-06-2006, 11:43 PM

Toontje

Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.
Posts: 46

Cut/ knife tool

This one is very tricky and I doubt that someone discovered the fundemental flaw of the cut tool, otherwise it would have been mentioned long ago. That is perhaps why I was never able to define muscle shapes with the cut tool in the past.

I gather I don't have to explain what the cut tool does. But I don't know if it works the same for all packages. But here it goes:

With the cut tool you can cut faceloops/ edgeloops into your model. Most of the time you hear that you can model small detail like veins easily with the cut tool, so let's do that.

After this I'll smooth it a little and select the centre edge loop. The centre edge loop is not really a continiuos loop because it terminates at each N-pole.
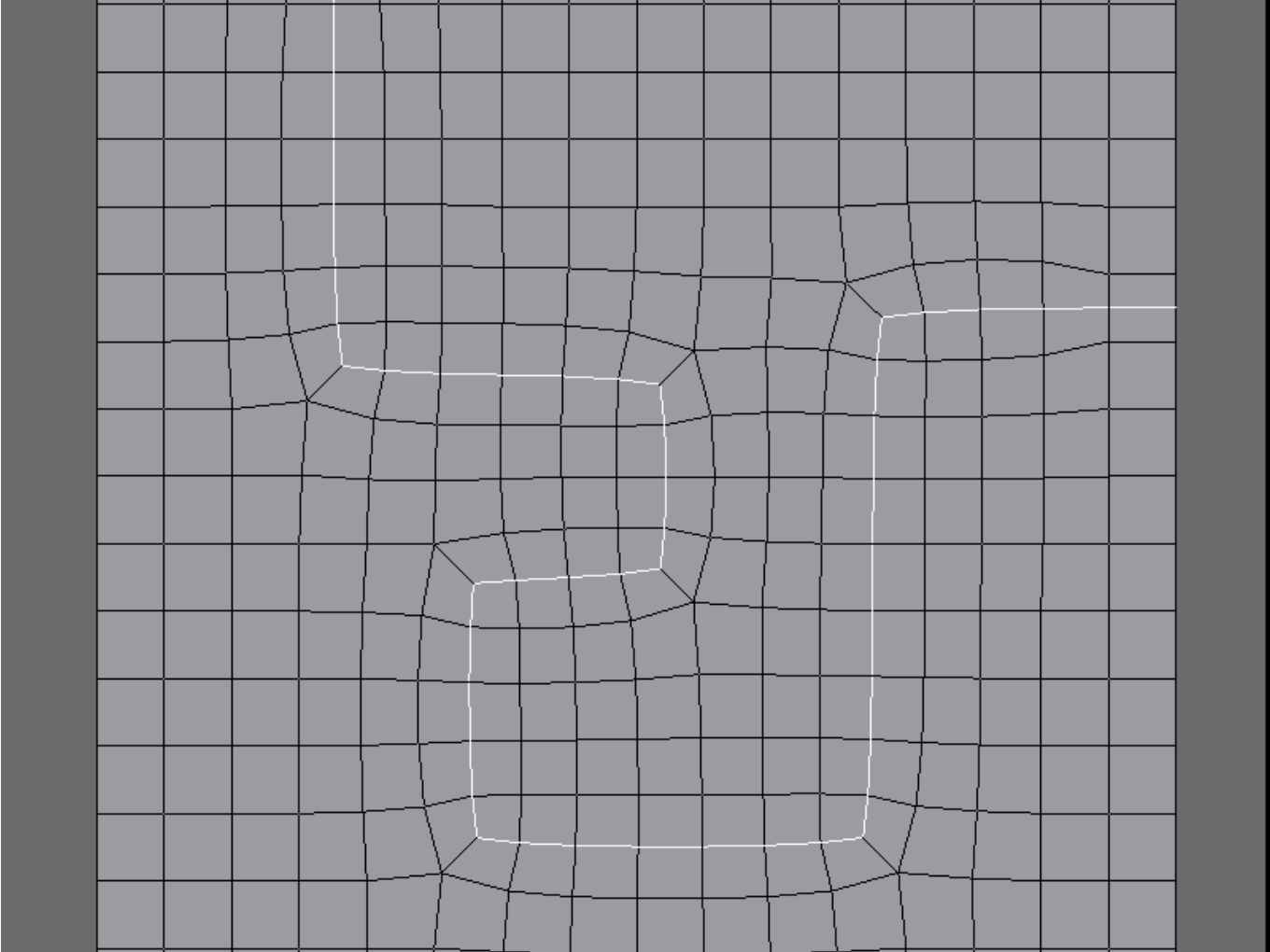
Lets pull this edge out to form a nice vein or something
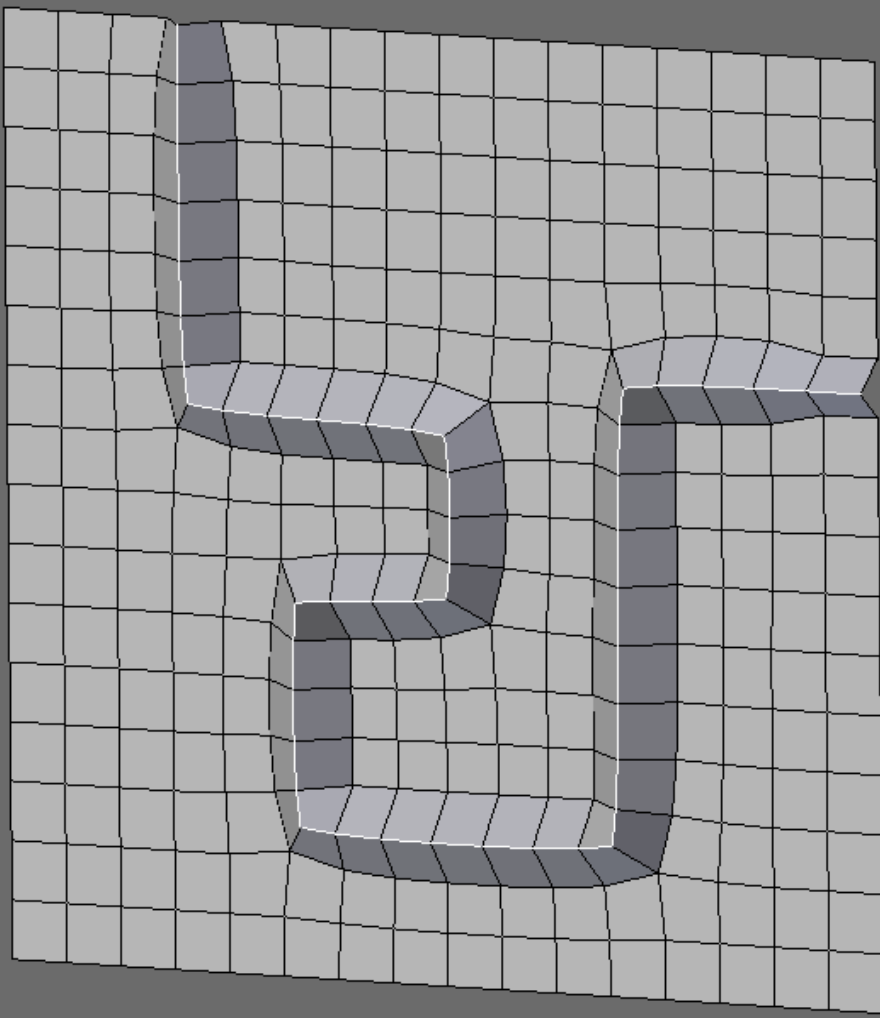
So it looks like a nice method to add detail or loops to a model right?
WRONG!
First of all remember that I've said how face loops got bent? They bend at a N-pole! All face loops layered after that one will get bent by the N-pole

Let's take a closer look at the cut mesh:

Observe how the face loop would get bent at the N-poles. Indeed there is a problem here: the location on where the face loop would bend alternates both sides of the highlighted edge loop. This will result in multiple face loops ru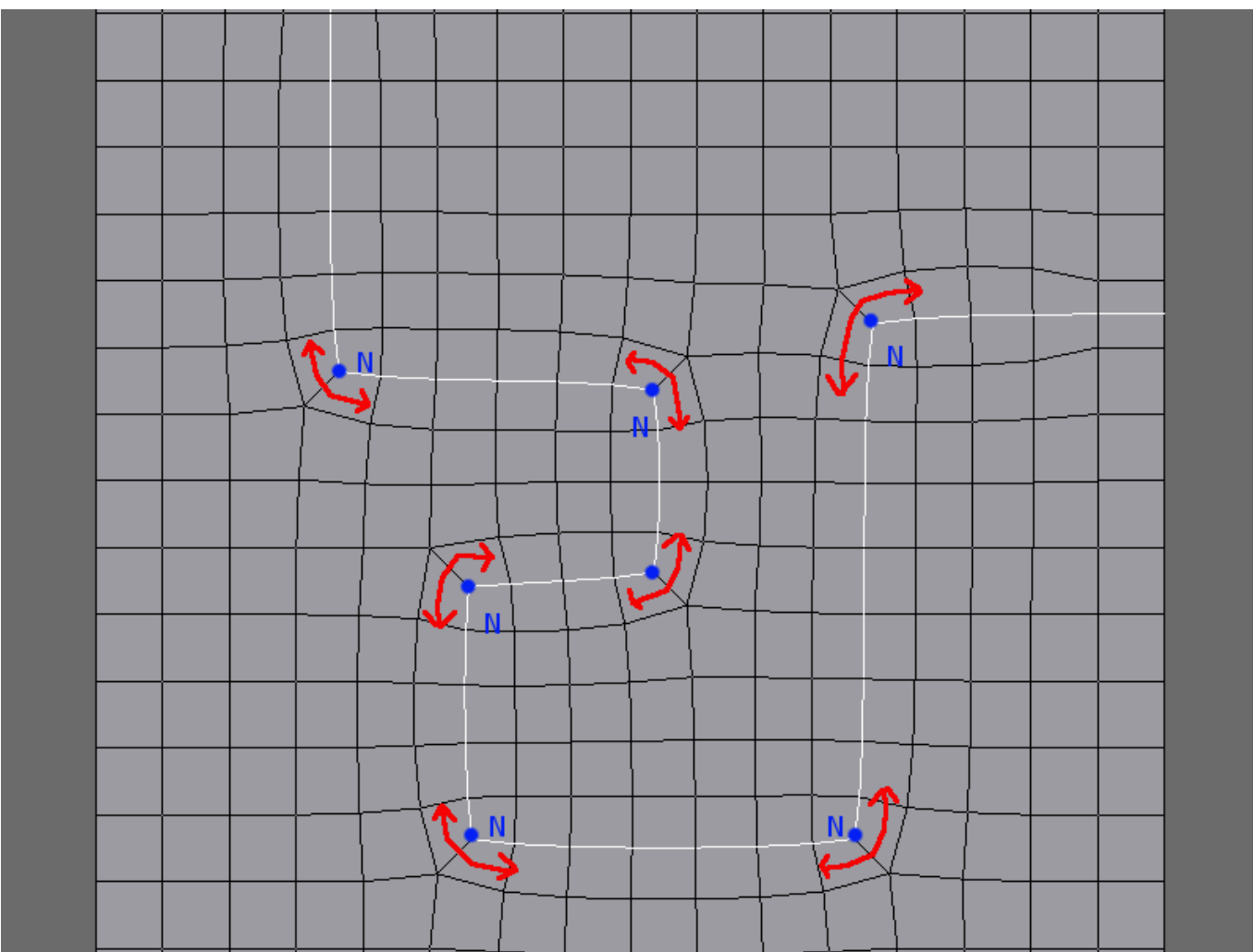nning ammock on the surface of your model. When you try to use t edge loop cut you'll see that the edge loop cut will snap unexpectedly on various location on the mesh.

Notice also that the bending side alternate at a moment that the cut changes direction on the clock. So if you keep cutting in a C-loop or closed loop (like a normal extrude) or keep spiraling with the cut tool, there won't be any side effects. But as soon you make a S-like cut then you'll have this problem.

So this explains a) Why nobody never experience problem while cutting simple loops (like eye loops, nose loops) early on when box modeling and that's why you mesh gets messy if you want to cut details on your surface.

Here I'll colour the face loops that are produced by this cut operation:
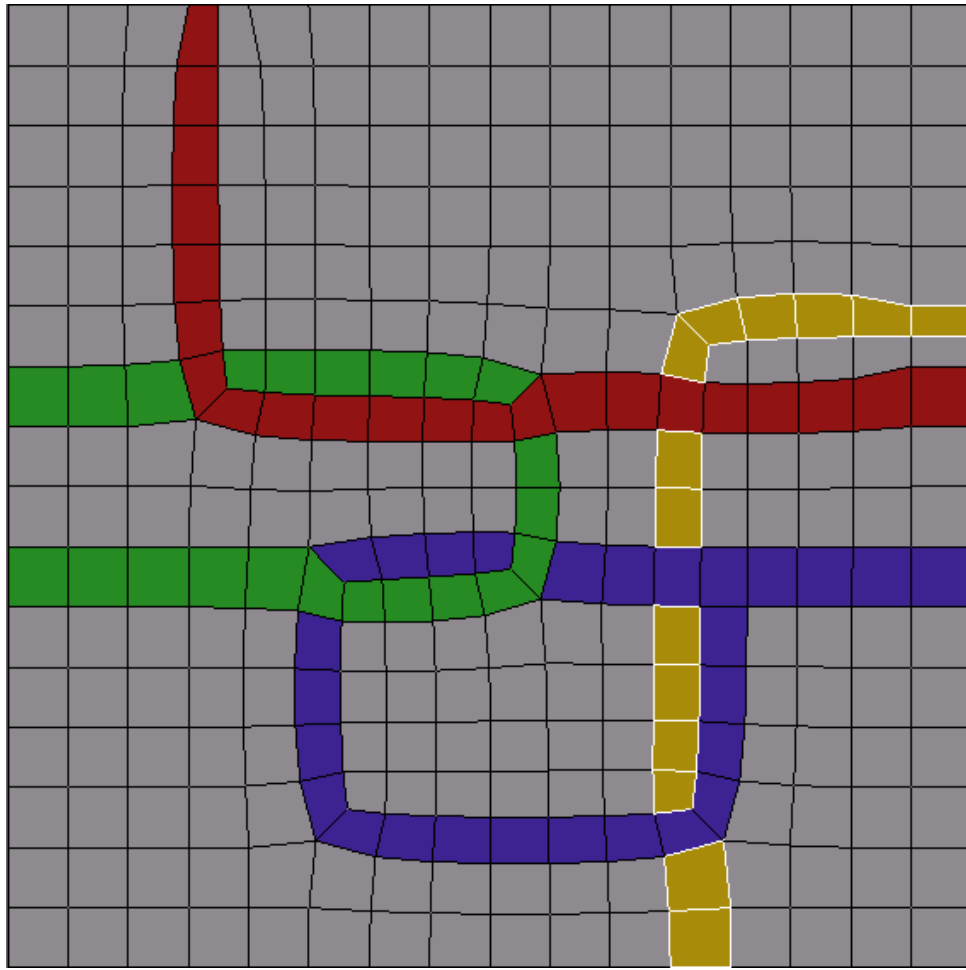
The knife tool was supposed to be some kind of wonder tool, a modelers dream, but here you see that it will reap havoc on your mesh leaving you with a heap of ugly and useless face loops.

But there is an elegant cure thanks to the obscure... or better said our hero: Spin Quad.

To end this post I want to remark that everywhere and everybody is talking about edgeloops. But in my experience I see that the face loops is the dominant factor in terms of topology. Heck, every top modeler seems to highlight face loops in their model even though they are wrongly talking about edge loops.

Last edited by Toontje : 05-07-2006 at 05:43 AM.

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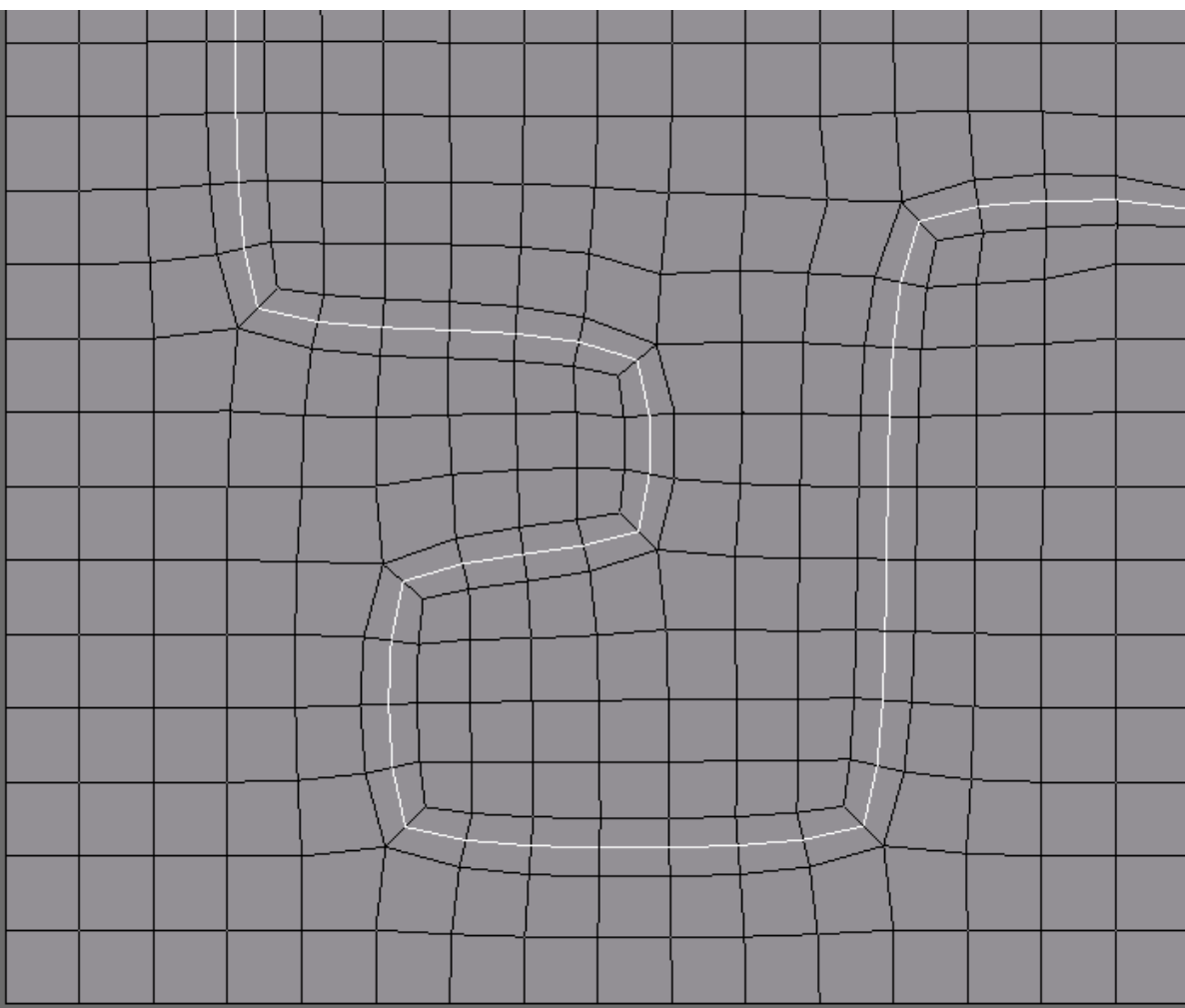#**33**
05-07-2006, 12:39 AM

Toontje
Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.
Posts: 46

### ● The solution for the cut/knife tool problem

Luckily there is a simple solution to this problem. Remember that things go wrong at the moment the the N-pole bends the loop on the other side of highlighted edge loop? Well, let us identify those N-poles that causes the problem.

Those edges that are blue should be spun. If the edge to be spun was preceded by a counterclockwise direction change in the edgeloop, then it has to be spun clockwise, if it was preceded by a clockwise turn, then spin it counterclockwise. HUH??? OK, for example, the first N-pole to be spun in the image above was preceded by a "L" turn. When driving on this L-turn you are making a counterclockwise move, so the first problem N-pole on the route should be spun clockwise. And vice versa.

When you spin those edges you have to perform the same corrections I explained a few post back. That is to delete the lone vertex and then fill the hole and smooth afterward.

And the result is only one face loop. To pick up where the problems started: Let's make a vein. Now we have to perform an edge loop cut.

Compare this image with the image in the previous post. They almost look the same, but this edge loop is truly continious. It doesn't bump against poles along the way.
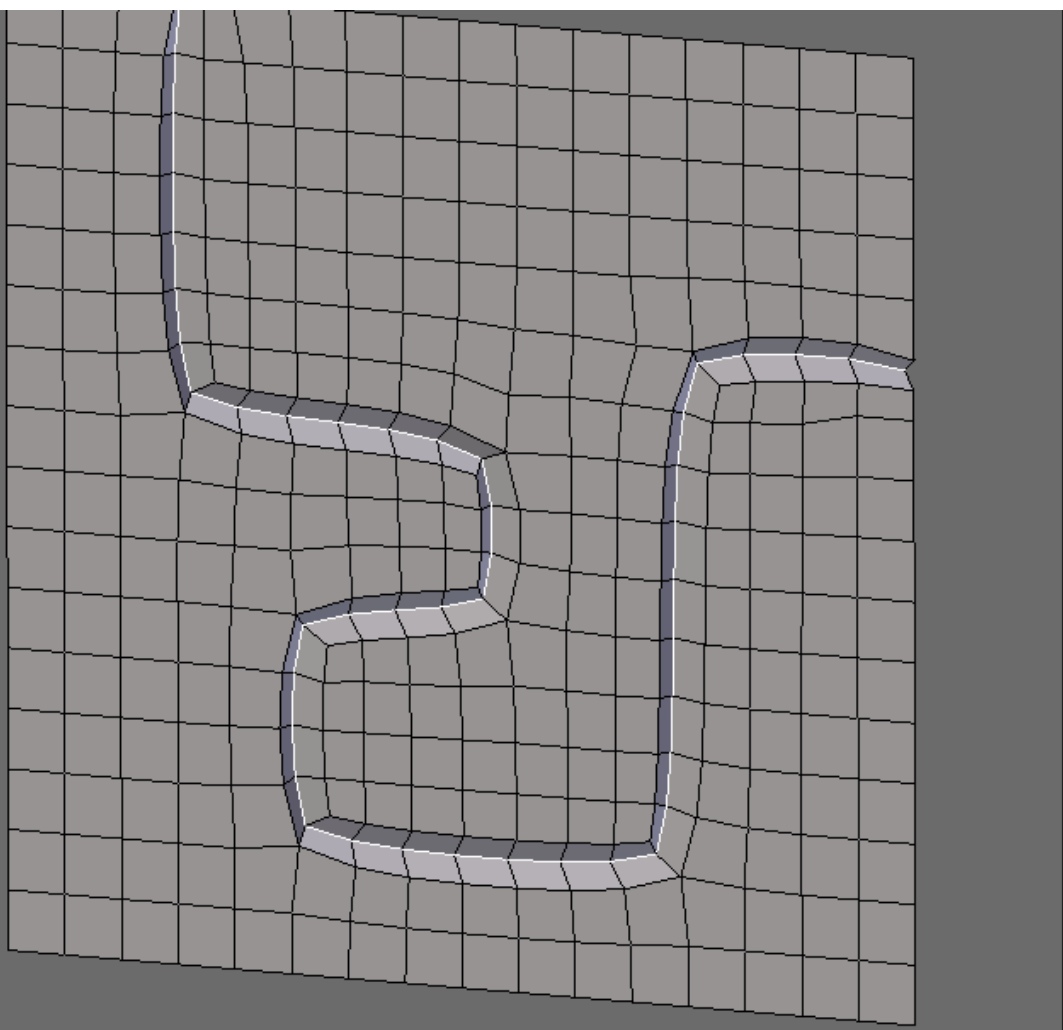
The topology/ mesh here is clean. Compare it with the previous vein example. The differences is hard to spot? Just follow the highlighted edge loop. Follow each little segment. On both sides of a segment there supposed to be one quad on either side. That is the case at the second example. But che the first example: in the problem areas, 2 segments of the edge loop share one quad, making it look akward.

Last edited by Toontje : 05-07-2006 at 05:23 AM.

Toontje

#**34**

mechis

#**35**
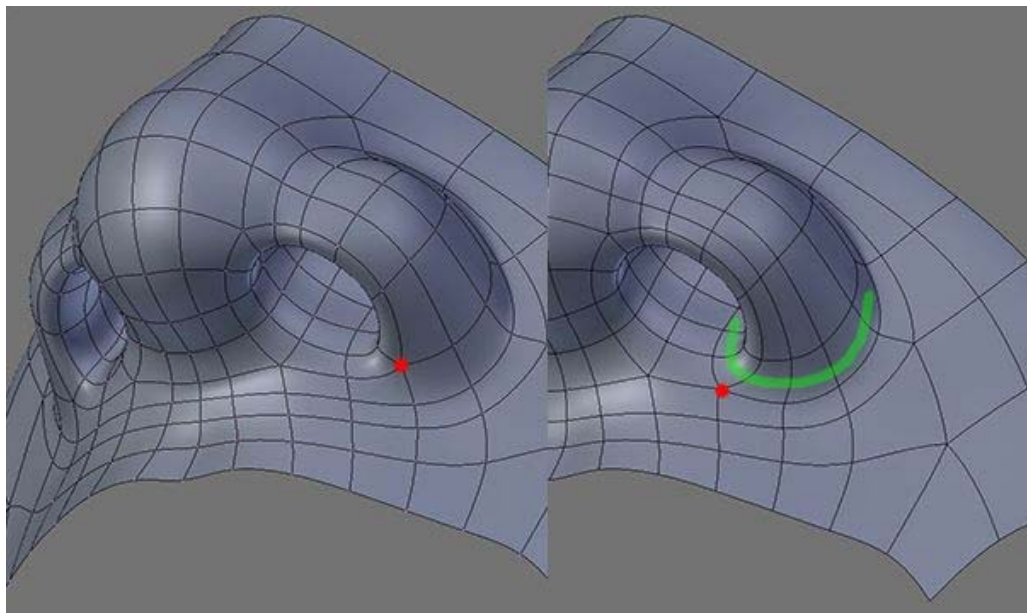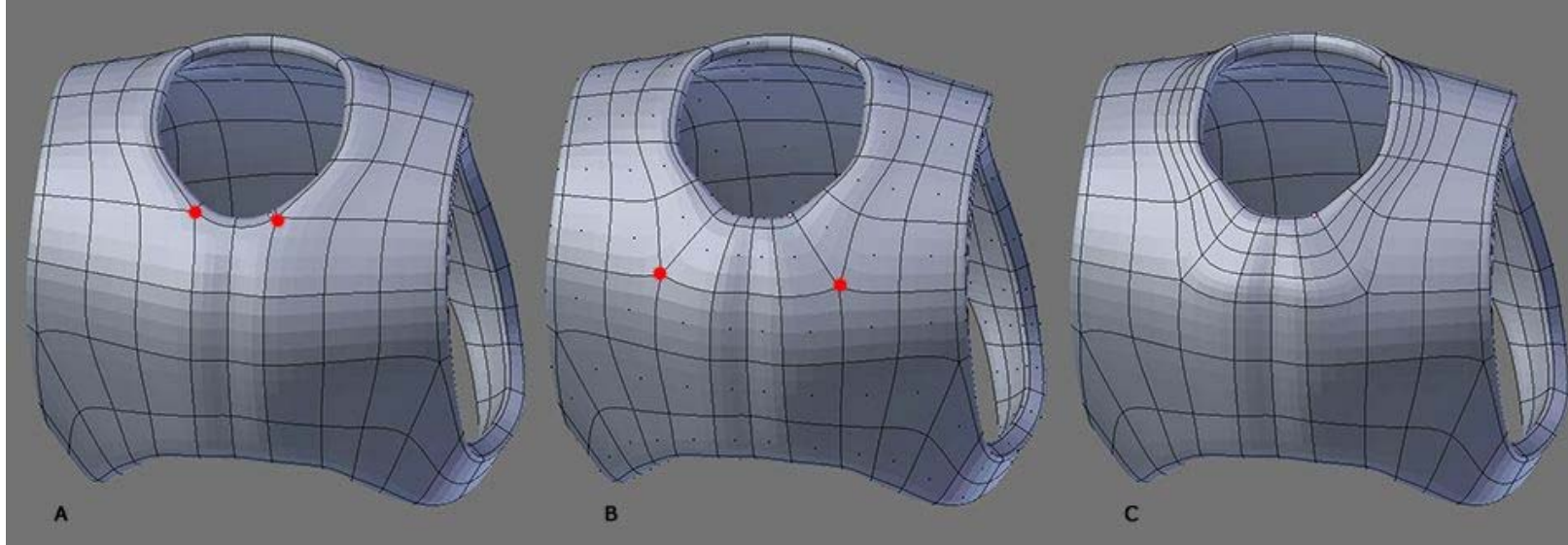05-15-2006, 03:53 AM

SomeArtist

Organic
modeler

Having a pole in a wrong place can make it very difficult to tweak your mesh. Take this nose for example, the Epole there (left) made it hard to twe the nose but after moving it into the right place a proper flow for the nose was created for better tweaking. Here's another example of a metal jacket:


A: These two Epoles made it hard for me to define that area so what I did was Unpolled them.
B: Now the Pole is in the right place and I have the Key-Loop for that area.
C: Fill-Loop, now I can start tweaking and add in more details as needed.

The next time you're having difficulty tweaking something it could be that "The Pole" is in the way so do something about it. If you're modeling the head and not sure how things flow just look at all the wireframes you have been collecting and pay attention to the poles.

BUMP
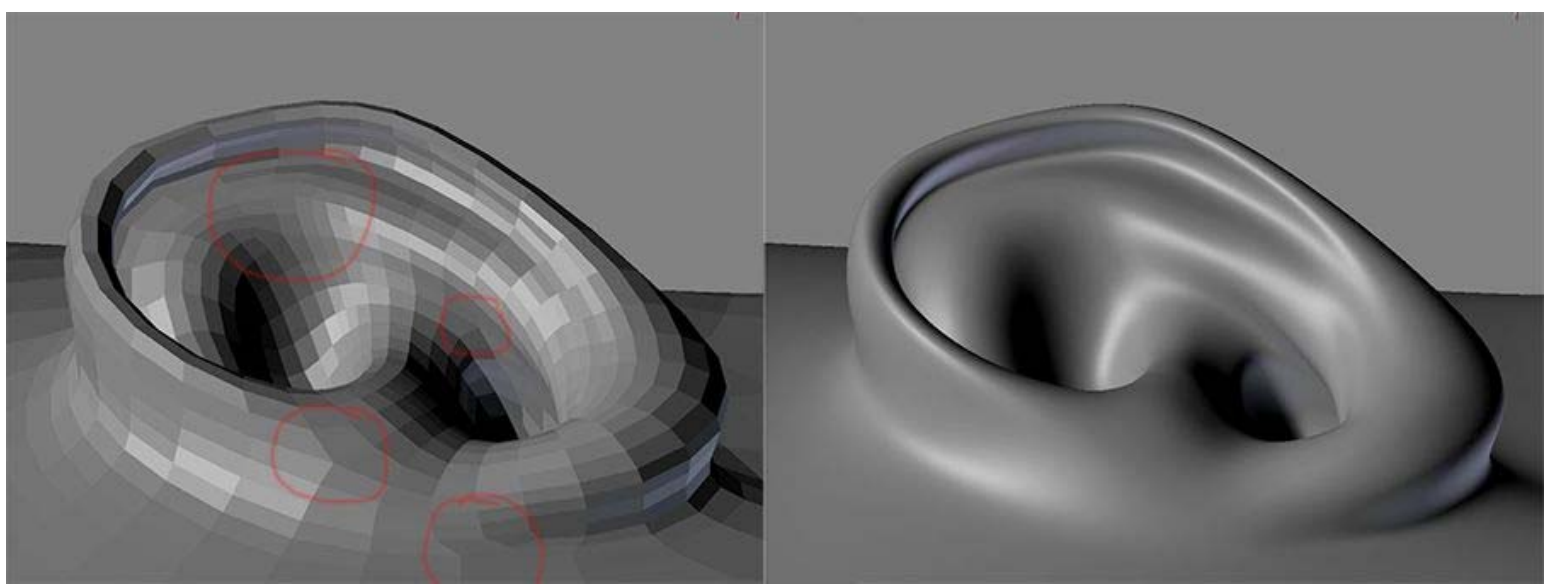
I pay careful attention to poles when I model so I tend to model in Flat Shade (left) because it allows me to spot Poles easily. When you smoothed it (right) it's impossible to detect poles so you can't really tell how they're effecting the model your working on.
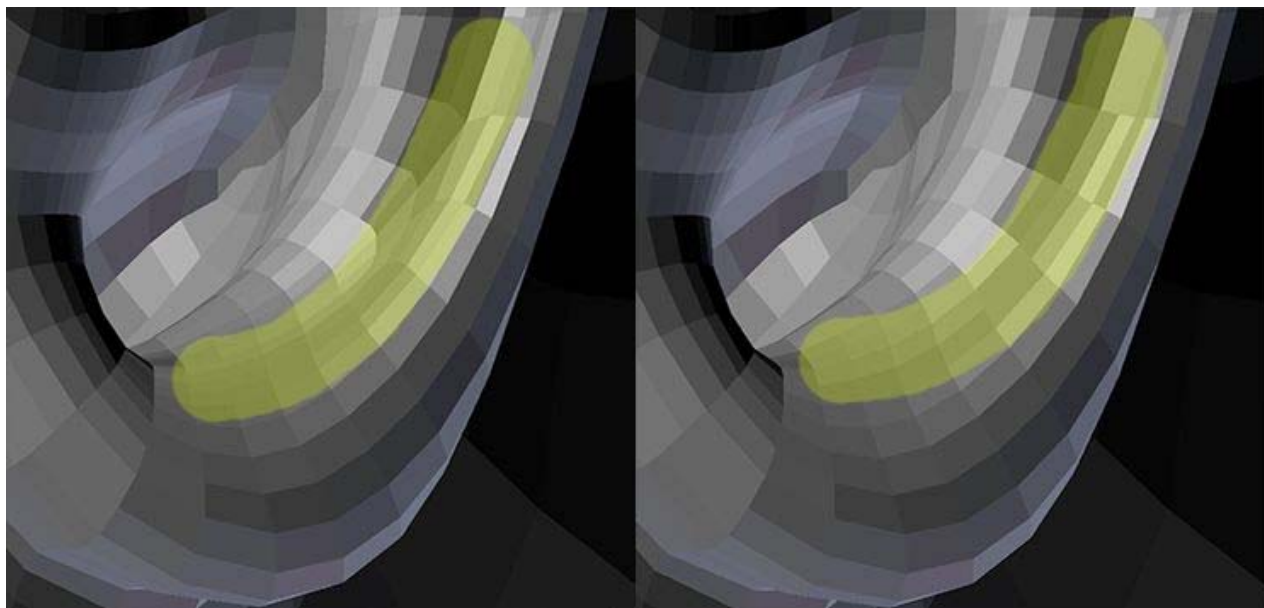
Look at the yellow **stroke** because on the left I purposely created an Npole and on the right there is none. The difference between the two is that the right is 100% Organic (it's very even) and I can keep on subdividing and it will give me a very smooth surface. Doing it with an Npole will give me not-so organic surface because The Pole is in the way and it disrupts the even grid.

I'm going to introduce a new concept called "The Stroke" and this concept is related to painting/drawing and sculpting. Imagine that you are holding a pen/pencil or a painting brush and imagine now that you are making a stroke and notice that you go in one direction only. You could go left and right OR up and down but you cannot go UP/DOWN and LEFT/RIGHT at the same time. Now that we have this new concept and instead of saying

[/i]"Don't place pole(s) in areas that deform."[/i] You can now say
"Don't place poles inside a stroke!"

Which is more logical because the stroke is what you're really focusing on! I'll talk more about this Stroke concept later and once you understand it you might ended up modeling like Stahlberg!

Quote

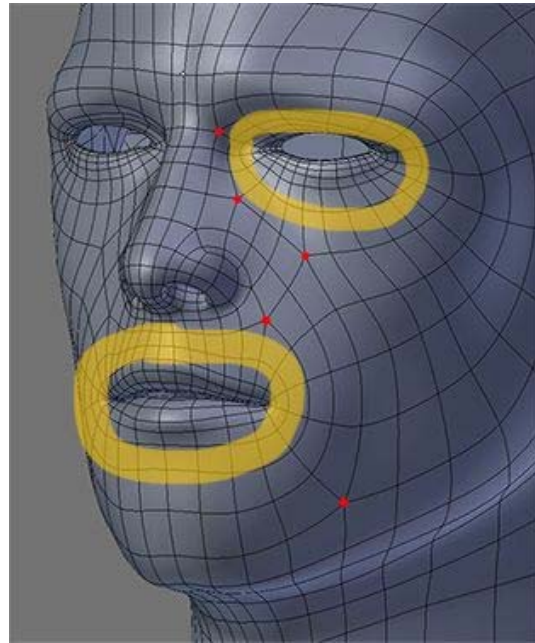[SomeArtist](#)
◯
Organic
modeler

🟠

Bumpiness and Poles are not difficult to understand. All you need to do is don't think about it! **Do what is required, do what is needed and the re
will fall in place** which is another mindset you should keep in mind.


Look at the mouth and eye.

1: Do what is required, Do what is needed.

What is required here is a circular loop and what is needed is a SMOOTH surface and there I have it. It does not matter where the Poles are since th
don't interfere with "What is required, what is needed" (aka The Stroke concept). This is one way of looking at Poles and the majority look at it this
way by the way. You can choose to look at it this way or you can choose to look at it from a Flow perspective or even both. If you're not sure where
specific pole should be then start collecting Wireframe references.
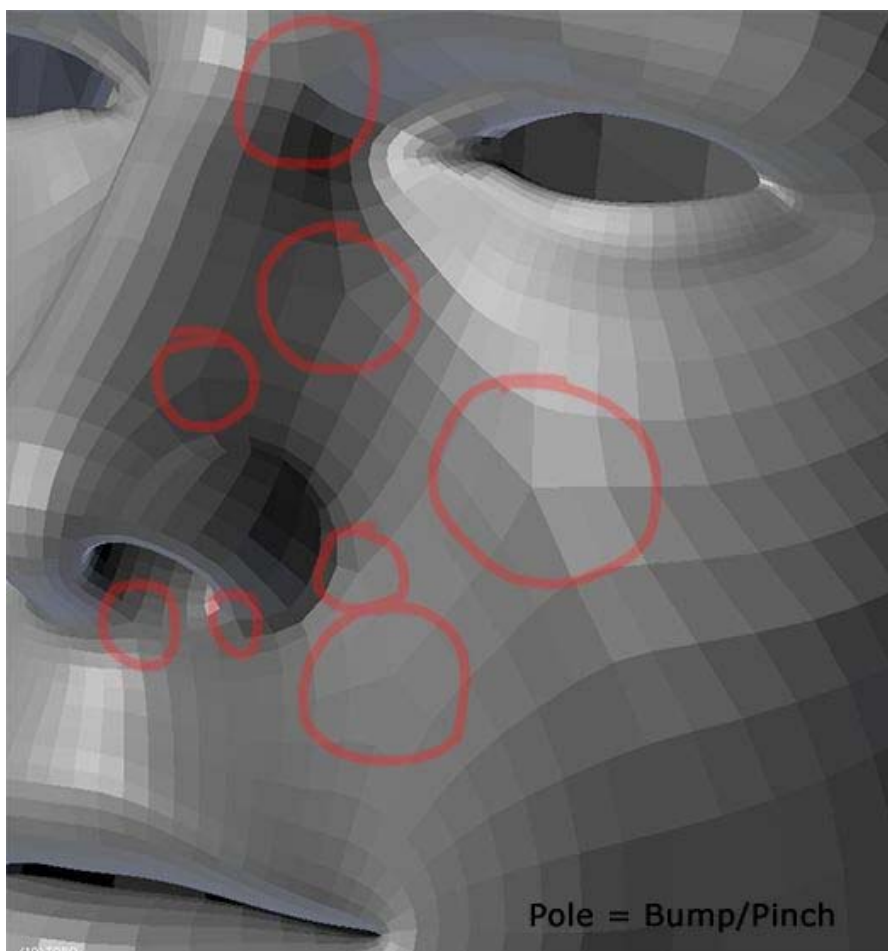
Pole = Bump/Pinch

There's not much to talk about Bump/Pinch in regard to static modeling since it's self-explanatory but I'm sure it will surface again when you get into UV and Bone. For now if a pole is bothering just unpole it and move it elsewhere. There, no more problem.

Extrude Loop / Spiral Loop
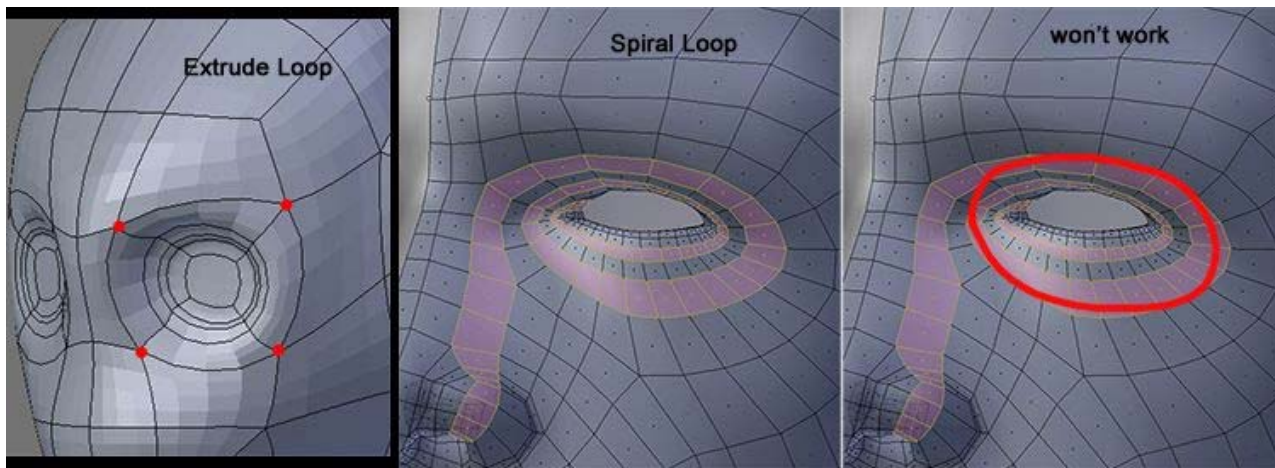
One thing to keep in mind when you get into edgeloop is the Spiral Loop. Once you break the extrude Loop you'll going to get the Spiral effect and when you do, don't try to rewire it so it goes in a circle because it won't work. I did an experiment where I broke the extrude Loop to get the spiral effect yet at the same time retain the extrude Loop – this is not possible. Beginners tend to use the Extrude Loop since it's easier and requires no knowledge of Poles. Now that you know how to manipulate poles you should start breaking the extrude loop to form the **S**piral **L**oop since the SL is more organic and it blends in with other areas of the mesh. Beginners extrude and leave it the way it is (not professional) and you can tell by looking at their mesh.

Remember to use wireframe references if you're unsure of what you're doing.
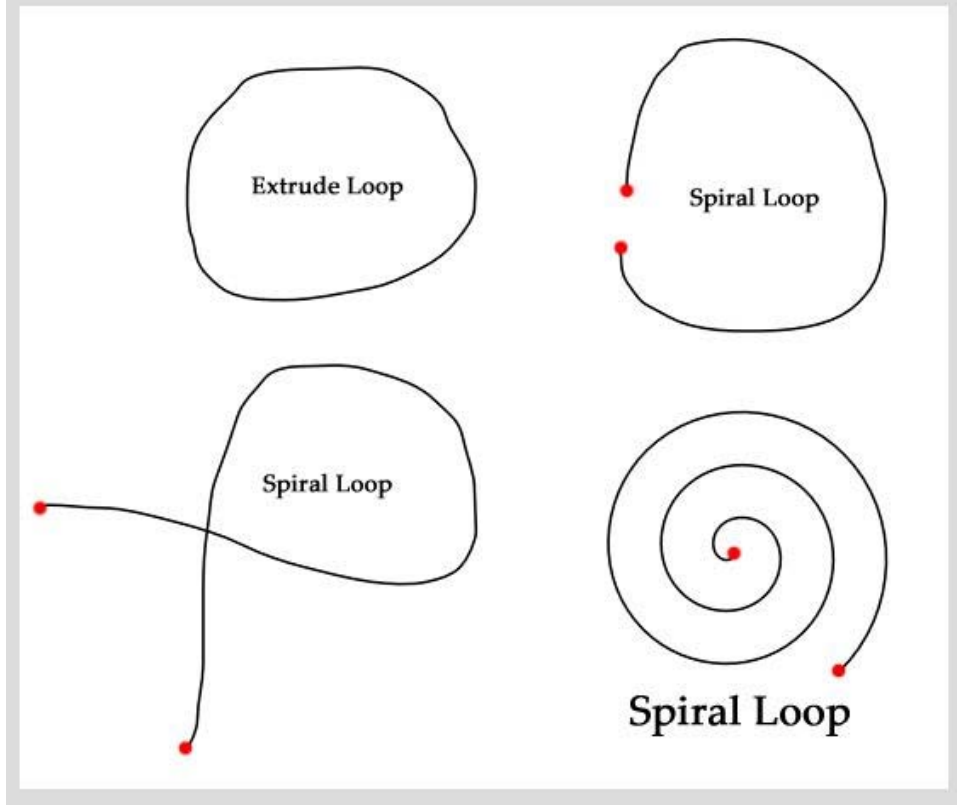
Pole and Topology
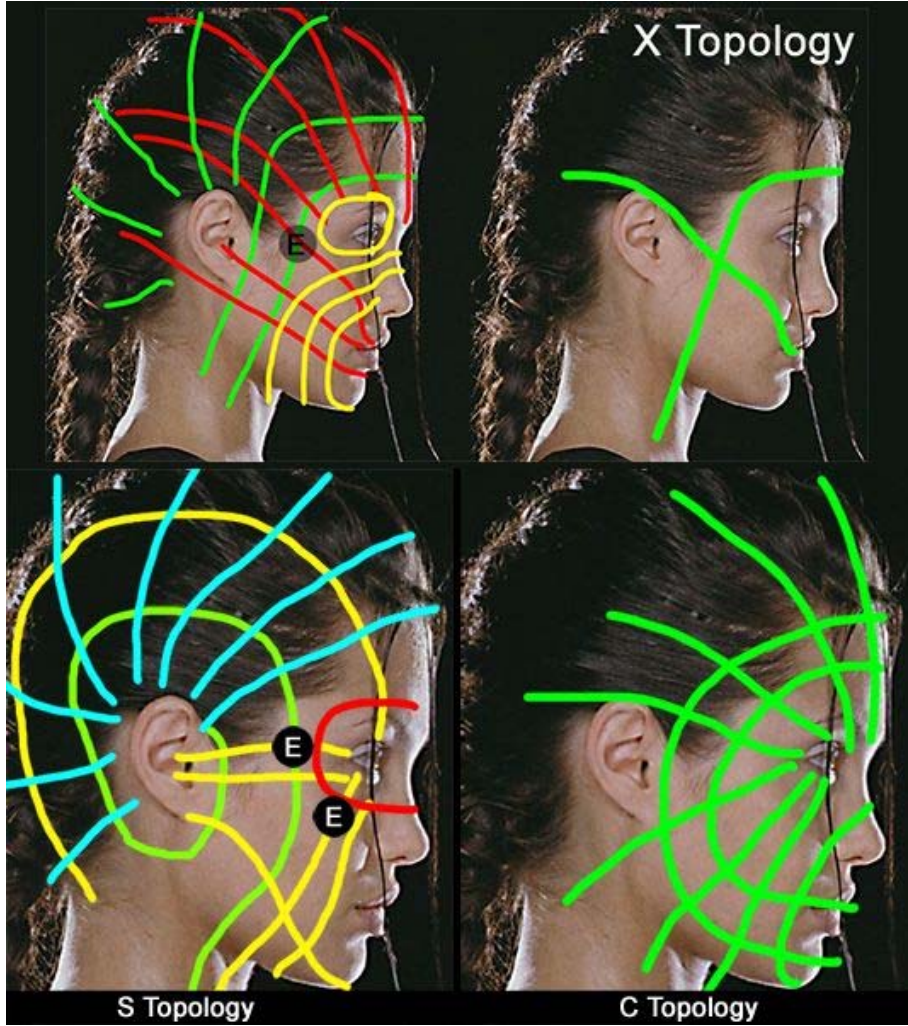
C:
From my experiments and understanding, the C-Topology is easy and fast and because of this it's suitable for Cartoon models (or even Creatures). Cartoon/Creature starts with "C" so this is one way to remember it. Trust me, you'll love the C-Topology once you model Manga/Anime characters!

You'll be amazed at the speed and efficiency of this Topology (assuming that Unpole is now second nature to you).

X:
Do not limit yourself to Cartoons/Creatures, you can actually use the CT on human heads and speaking of Human heads, X is mostly used by professional artists. It gives you greater control and defines the head better.

S:
If you're bored with CT and XT try ST. This topology is not that common but it's there for anyone who wants to get fancy with Topology.

That's all there is to Topology (ST, CT, XT) and out of these three you can mix/combine and get a variety of new ones (unpole) but it's all based on one of the three so pick one and start from there. In the future I'll show you a wireframe version of these 3 Topologies for now you must collect wireframes elsewhere since I have only touched the C.

Generally speaking, when you look closer you'll see that the CT has no pole around the cheek and that the XT has one Epole between the ear and ey This says that a pole or poles defines a Topology.

Quote

SomeArtist

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#**38**

SomeArtist
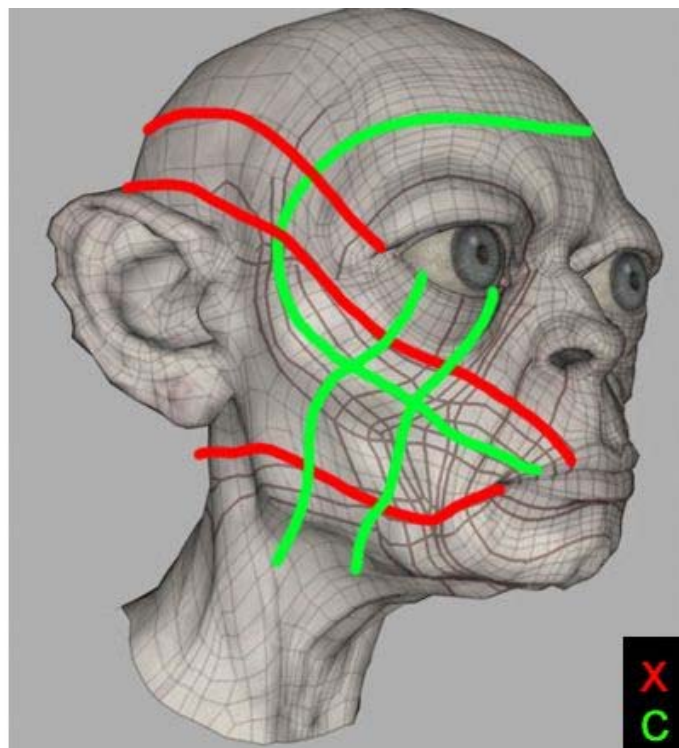Organic
modeler

Join Date: Jan 20(
Posts: 67

Quote:
  Why does your ref for the xloop have only the two lines on it,

I drew that two lines to show the reason why I called "X" because it looks like an X and that's how it flows for that particular topology. Just like the and S (Spiral). By the way, Gollum's facial topology is a mixed of XT and CT!

Actual wire ref

X
C
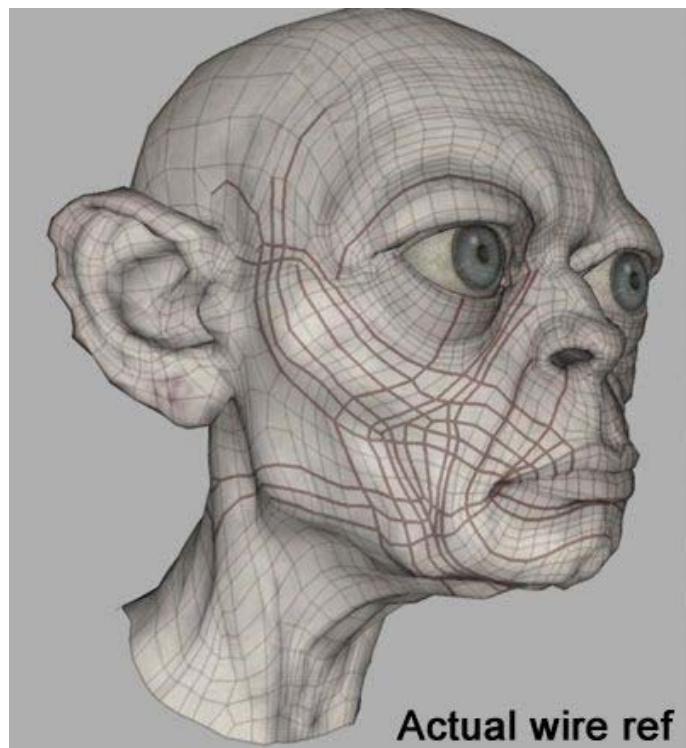
I got this reference at some forums, not sure where and when. I hope the creator doesn't mind me posting it here.

Quote:

  step by step pics of making an eye

If I do that then you will be a slave to that step by step method. A step by step is not the way to learn! The net is full of step-by-step on how to mod a specific thing but the key logic/mindset is never explained that's why I am here to fill that gap. You'll see clearly in the next post where I show yo the MINDSET/Logic for the Ear and you will say "Wow! The ear is that easy???" Yes, it's that easy because now you have the mindset (next post).

What's important here is the knowledge of Poles and the Unpole technique. Practice and **meditate** it because that's all there is to Sub-D modeling. If you can change flows, if you can solve Triangles, if you can shift poles around then all you need to know how to model the eye is the Logic/Mindse for it. Wait for the next thread (The Tweak) and the answer will come. Toontje brought up an interesting observation (A flow bends at an Npole) which I will get into later and this is what you should be looking for. If you understand a mesh and can control it, what is there you cannot model?

I don't model that much to be honest. What I do is I open Wings/Blender and play with Flows and just shift poles here and there.

Quote:

  I like that spiral loop thing.

Don't try that on the mouth. Know what you're doing and you'll be fine.

Quote:

  I am not happy with a lot of my loops in my lzard loop

The trick to modeling is not just having the actual references of the subject, but the actual wireframes of that creature as well. If you can't find a Lizard wire then look for a similar creature... I'm sure others have modeled the Lizard already. The reason why the human head topo is easy is becau everyone is modeling it and there are a lot of wires out there for grab.

Quote

[The Pole - Page 5 - Subdivision Modeling](#)

I agree with SomeArtist. I think that JohnFnoo missed the whole point somehow.

I made a schematic topology of his iguana fo illustration:
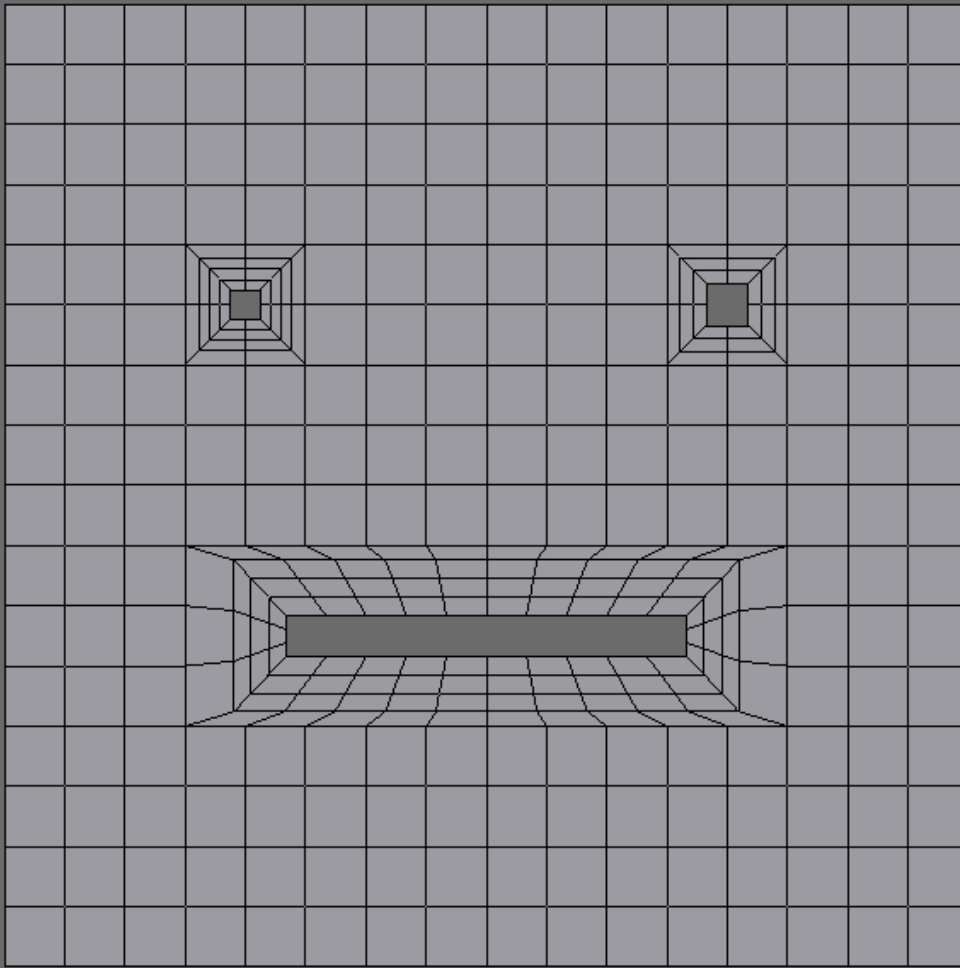
You have here 3 extrude loops, 2 eyes and a mouth. That is a start. Now the trick was how to convert those to spiral loops? How to introduce extra topology?

How does one place loops/ poles? How does one move poles and unpole? What are key loops and what are fill loops?
If you can master these techniques SomeArtist laid out, you don't need step by step tutorials. Chances are that you are the one whos going to make them.

I placed some loops on the schematic topology for your Iguana that in my view would enhance its topology and form. To give the form more realism, figure out where to place E poles for bumpyness.
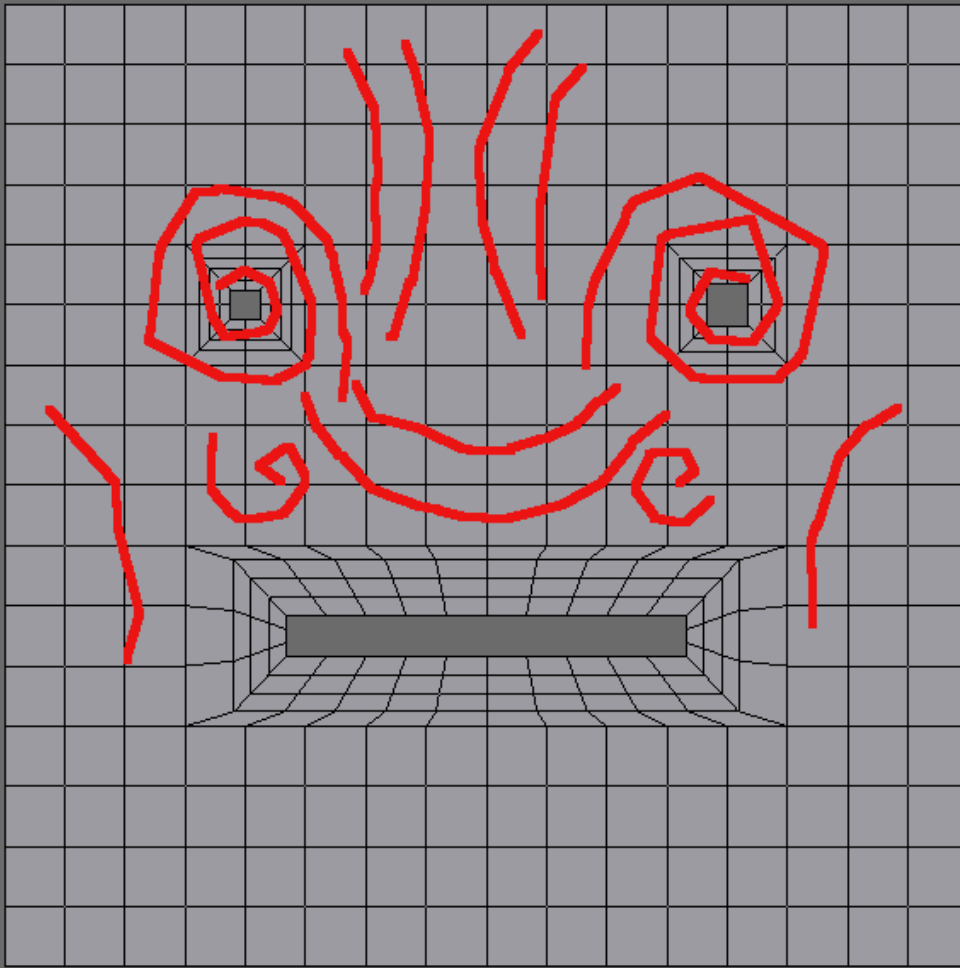
So figure out, where should you place loops and through which method (extrude, break, spin etc) to match those on the image above? What kind of poles will be created? Should you unpole them or move them around?

SomeArtist, I have a question for you. Have you figured out how to place diagonal topology on a mesh? I mean, if you take a close look at everything we discussed until now, the topology remains pure orthogonal. I think I can illustrate it better with a picture:
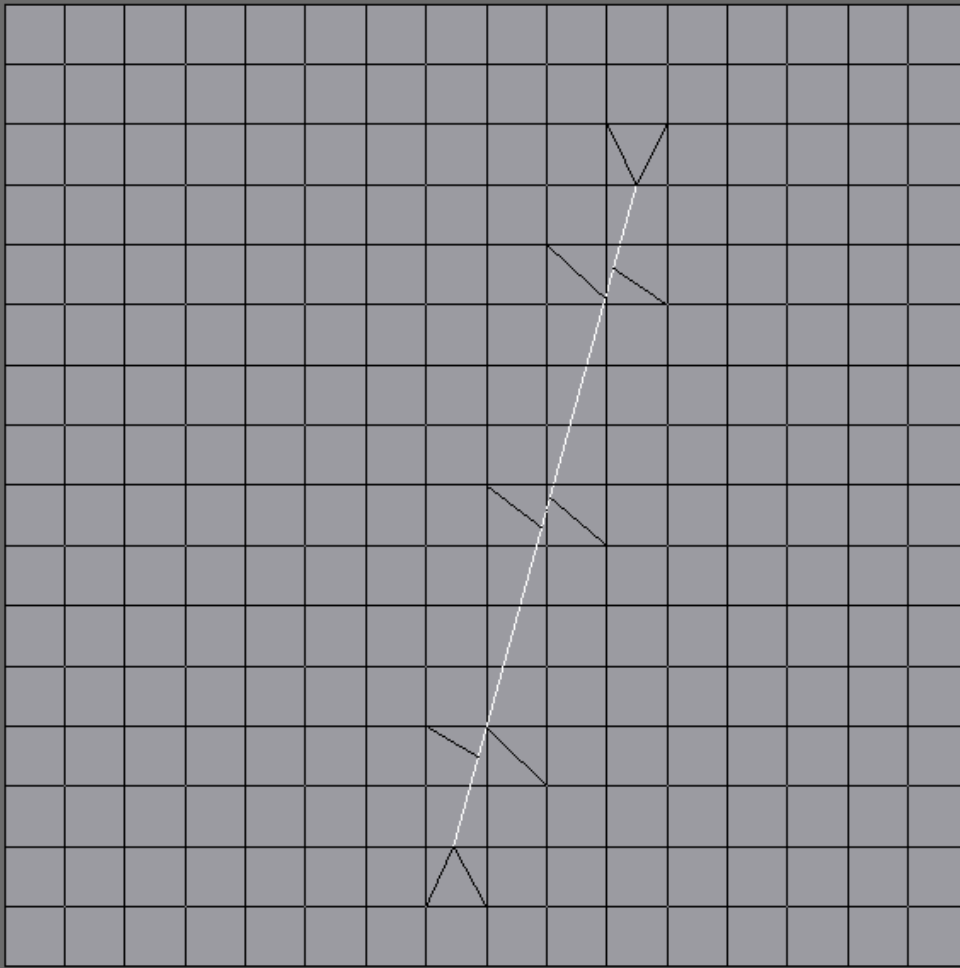
I've been battling with this problem for weeks now. What I wanted to do was to apply what I learned so far to form the sternocleidusmastoid (that thick muscle from ear to base of the throat). By cutting your mesh at an angle it is left totaly useless because of the pole it creates on both sides. Furthermore the cut is not a contineus edge loop.

Even though I have a lot of topology references, it is very hard to analyse how those profesional artists solve this problem. Look at the Golem topology for example. It has a ver nice flowing mastoid. I tried this (schematicaly of course):
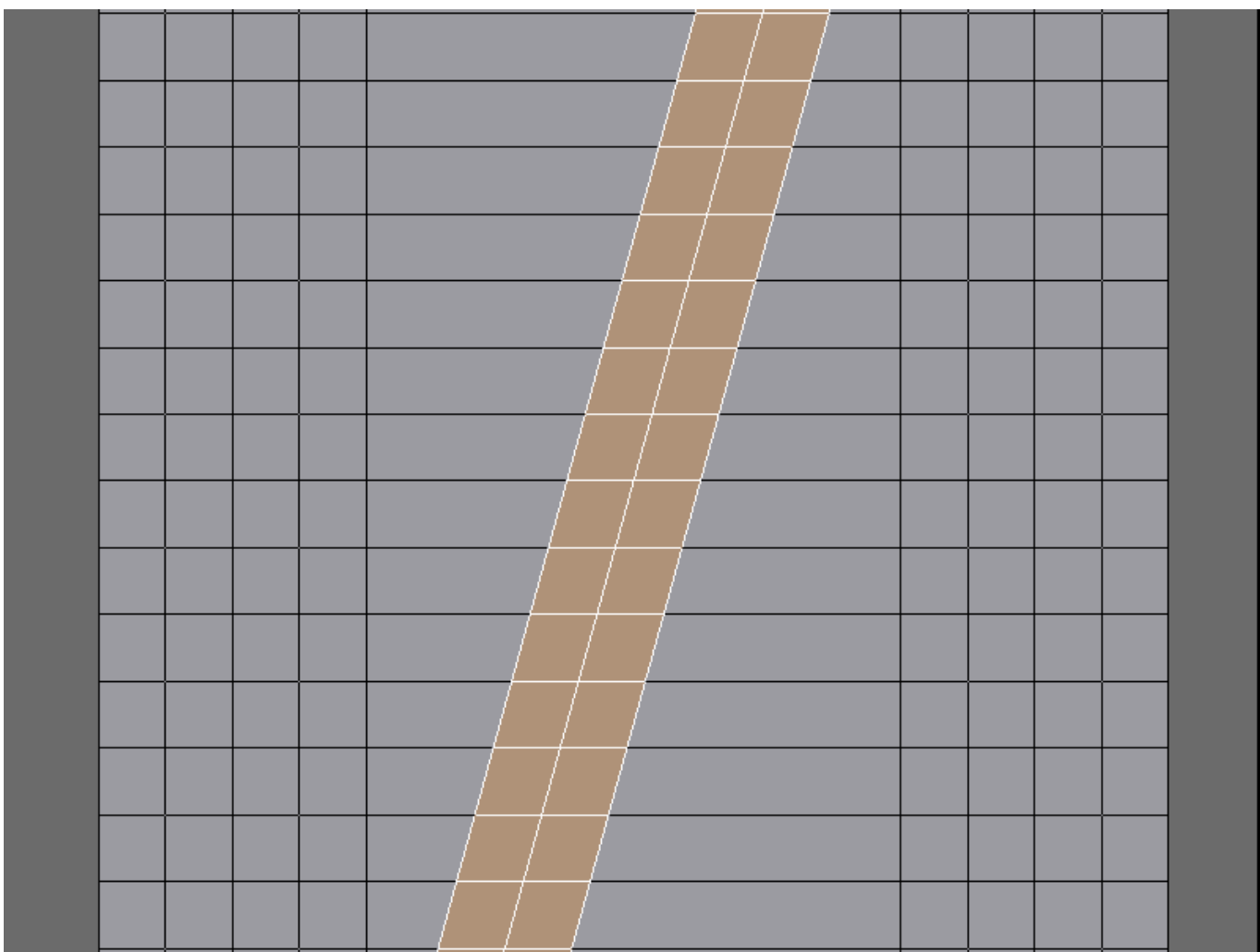
The problem is, what to do with those empty space. What kind of topology should be introduced there so I can deform this part of the throath accordingly?

I've tried a few solutions, but none does look as nice as Golems or the other profesional ones.

Continued at the next post....

Last edited by Toontje : 05-21-2006 at 07:09 PM.

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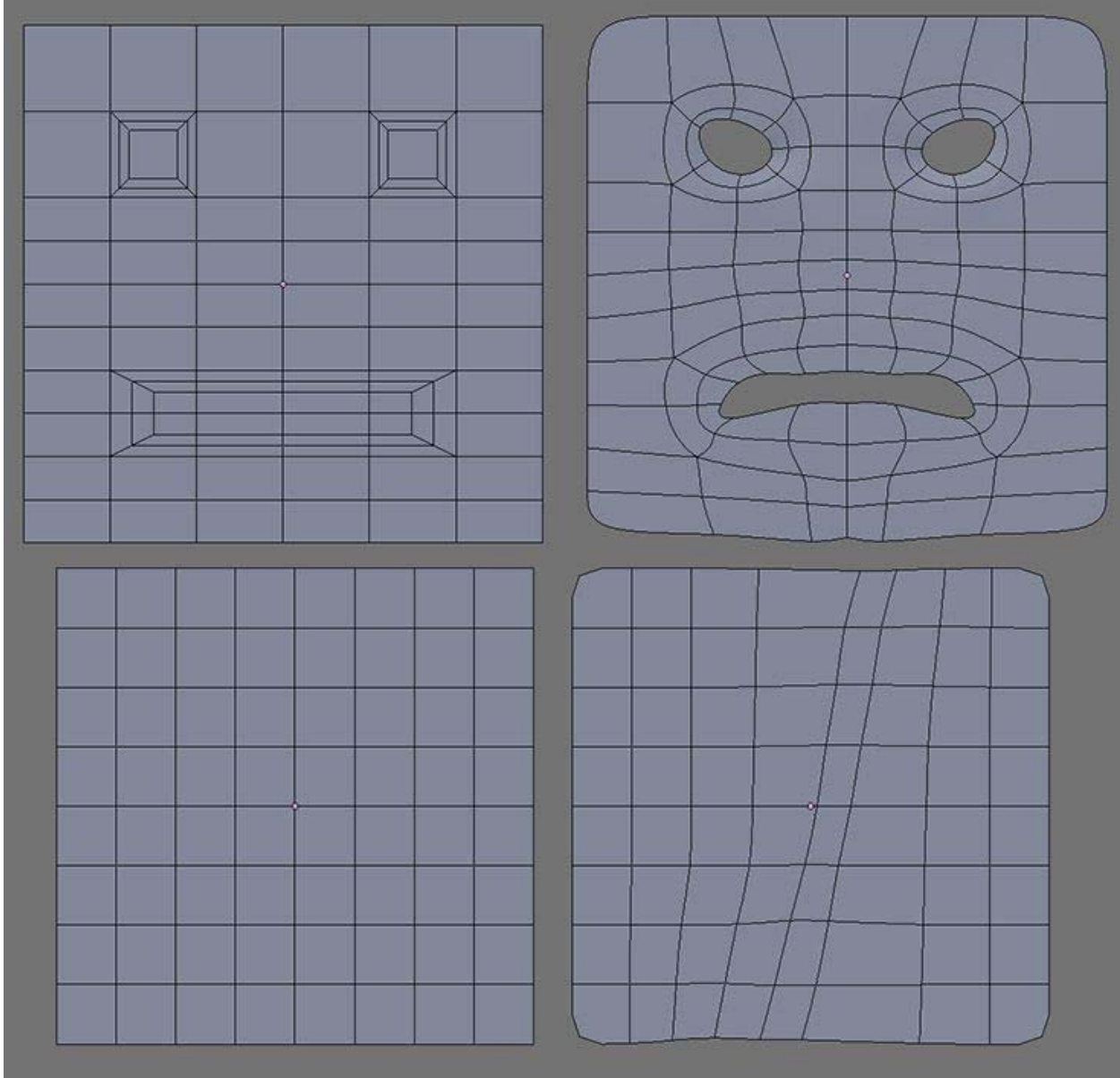
#**42**
05-21-2006, 09:46 PM

SomeArtist
Organic
modeler

Join Date: Jan 2006
Posts: 67

When it comes to Box detailing it's all about the Extrude tool. The Eye, Ear and mouth, they all start with an Extrude. What beginners don't know is the tweak which is the topic of my next thread.

Sometimes the answer is not more geometry but "Clever Tweaking" because it can get the job done and saves you from poles/tris headaches.
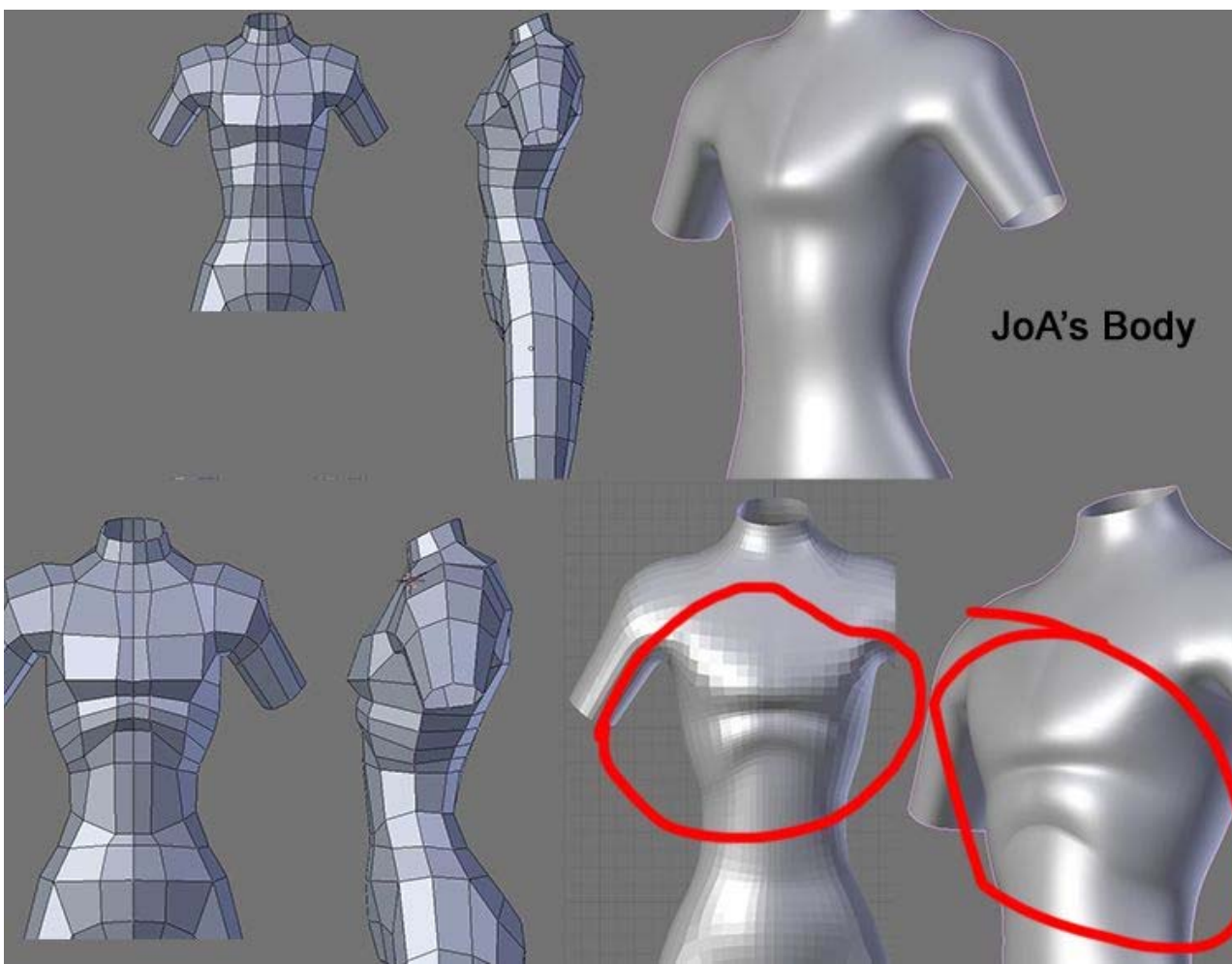
When you get into Tweaking you will get back to Mesh Resolution/Key-Cut & Fill-Cut. The whole point of creating a form is to build a Grid mesh so that later in the Pole stage you can break it to form flows. Before you start introducing E and N poles to create details try Tweaking it first to see if it's possible to do without poles and if not then start breaking the Grid.

Quote:

 I have a question for you. Have you figured out how to place diagonal topology on a mesh?
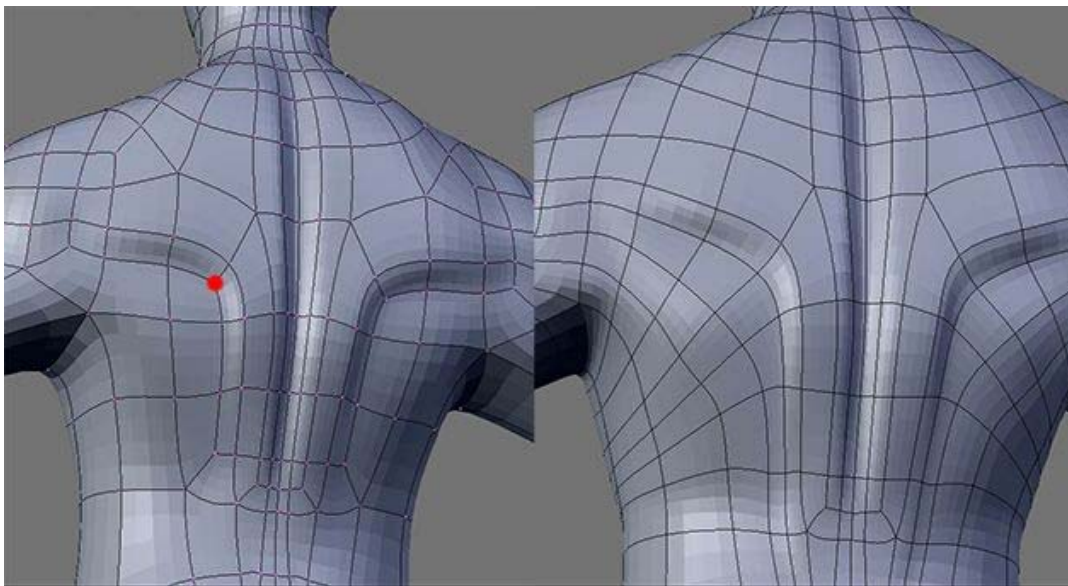
This was brute force because Blender doesn't support Ngons. Check the "Blender: No Ngons are allowed" thread because there is a video that shows how I did it (I'll upload it to my blog if the link is down).

Quote:

 I've tried a few solutions, but none does look as nice as Golems or the other profesional ones.

It's all about breaking the grid via unpole to get a desired Key-Loop. Once you have the key-loop the rest will fall in place. More on this

later.

SomeArtist

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#43
05-22-2006, 02:22 AM

Toontje

Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 46

I was going to elaborate more on my way of tackling this problem, but I took a closer look at Gollum's throat when it hit me: It consist of X Topology!
Now I see the beauy and genius of the XT. The face/ edge loops flows 3-dimensional! The other topologies can be explained with a scematic flat mesh. But not XT because the flows goes around the object in different planes. I think that the XT loop will result in better organic forms because you'll have more room to detail and shape out your form.

In you example of the back of your model a recognise those X loops too. A X loop is a double edged sword because you can control details in 2 directions at once. For example in Golum:
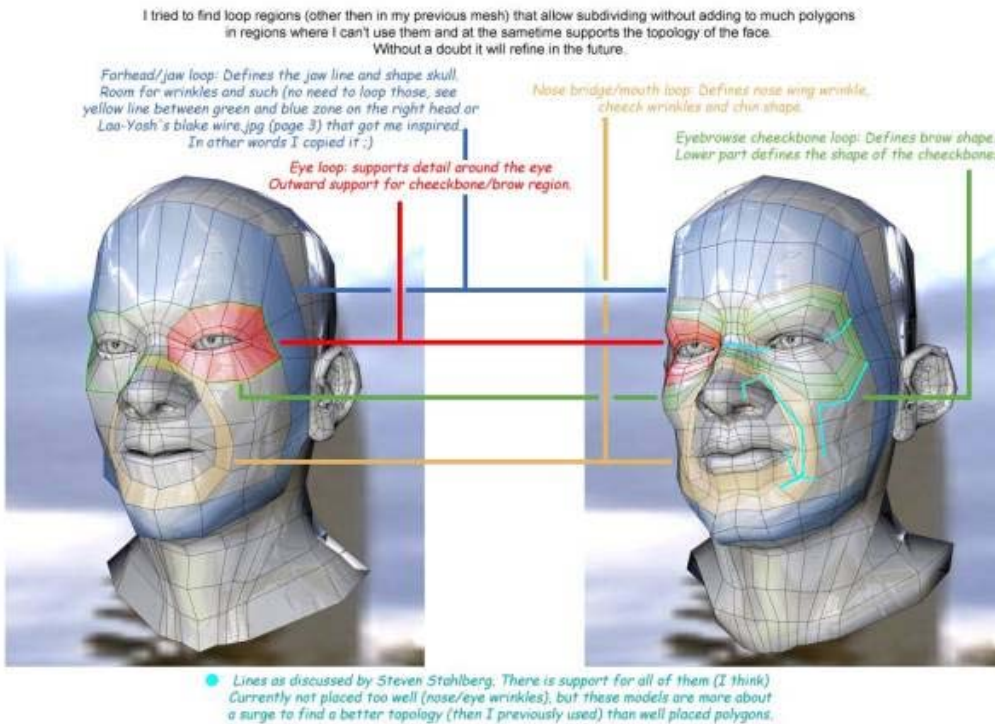

Actual wire ref
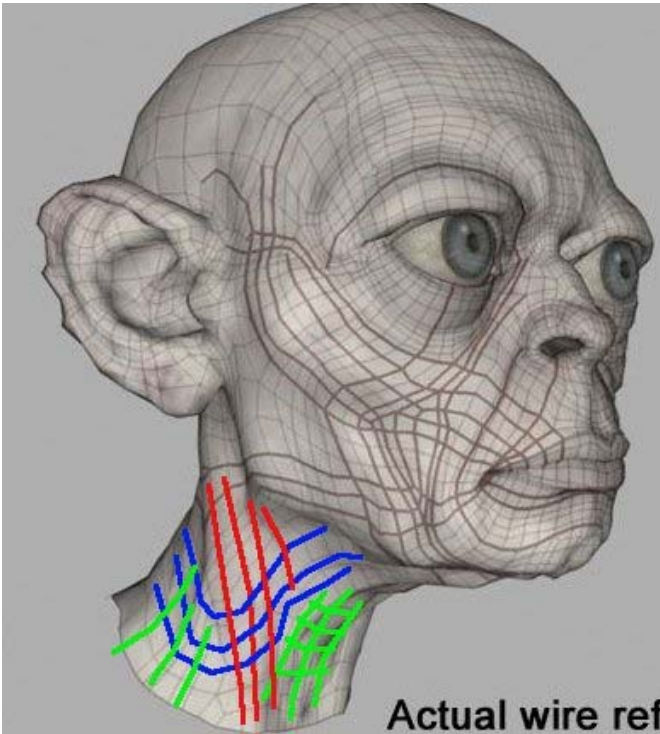
The desired form/ topology is the red sternocleidusmastoid (mastoid for short). As an added bonus due to the XT you have lines running up at an upward angle which coencide with veins that should run over the mastoid (very anatomical correct) and the scelenus muscles between the trapezium and the mastoid. I've seen lots of wireframe where this is not correctly done. Most of the time the artist have etched out the anatomical details through Z-brush. But with the right topology there is no need for z-brush or normal maps in these cases. I think that these X loops are excellent for modelling muscles that are interwoven with other muscles or attached to bones visible under the skin (like the serratus).

Another good mastoid example is Geri from Geri's game.
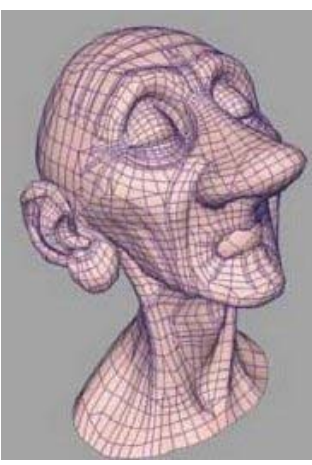
Sorry I couldn't find a bigger picture, But also here there is a X topology present at the throath area.

The folowing pictures are throath topologies that are not correct in my opinion:

I tried to find loop regions (other then in my previous mesh) that allow subdividing without adding to much polygons in regions where I can't use them and at the sametime supports the topology of the face. Without a doubt it will refine in the future.

Forhead/jaw loop: Defines the jaw line and shape skull. Room for wrinkles and such (no need to loop those, see yellow line between green and blue zone on the right head or Laa-Yosh's blake wire.jpg (page 3) that got me inspired. In other words I copied it :)

Nose bridge/mouth loop: Defines nose wing wrinkle, cheech wrinkles and chin shape.

Eye loop: supports detail around the eye Outward support for cheeckbone/brow region.

Eyebrowse cheeckbone loop: Defines brow shape. Lower part defines the shape of the cheeckbones

● Lines as discussed by Steven Stahlberg. There is support for all of them (I think) Currently not placed too well (nose/eye wrinkles), but these models are more about a surge to find a better topology (then I previously used) than well placed polygons.

Although the head has a nice XT, the throath area lacks definition and topology. Basicaly it is just a cilinder, no real face/ edgeloops there.
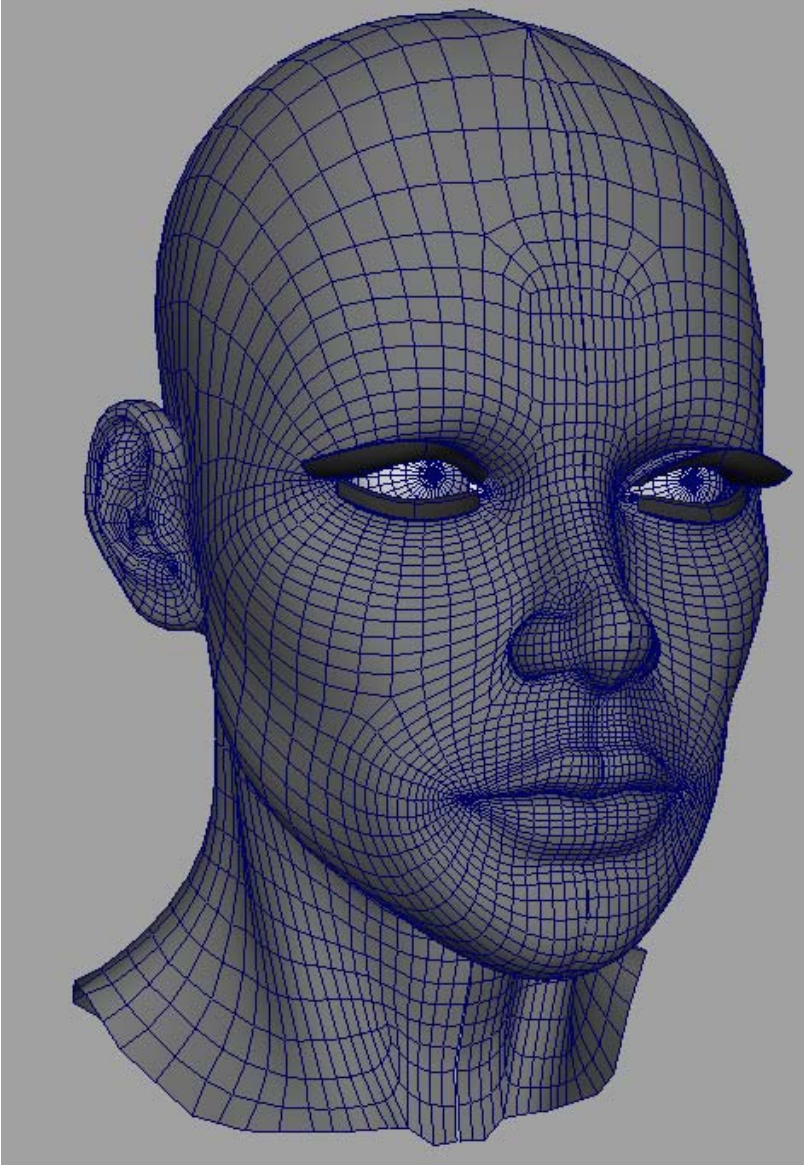
Here you can clearly see that the modeler has a hell of a time trying to define the mastoid. He tried to make a C-loop at the larynx area. But it doesn't quite cut it. The model needs a high mesh density to model the mastoid, and even then it comes out totaly akward at best. An error we rookies make all to often.

Last edited by Toontje : 05-24-2006 at 12:07 AM.

Quote:

Toontje

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#**44**
05-22-2006, 02:41 AM

Toontje

Bachelor/
Ingenieer

These are examples how it should be done:
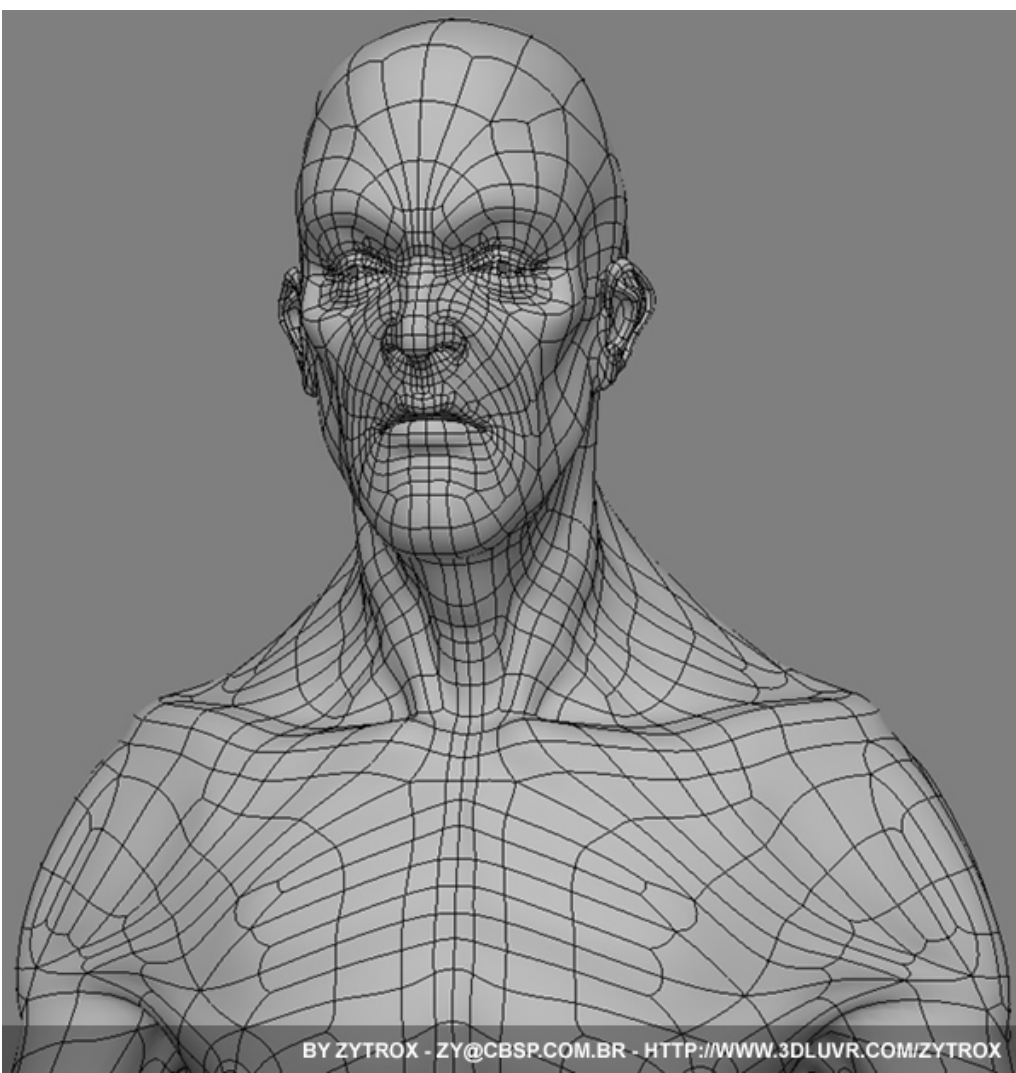
The X topology is imidiately noticable at the mastoid. There is a nice organic definition at the throath area.
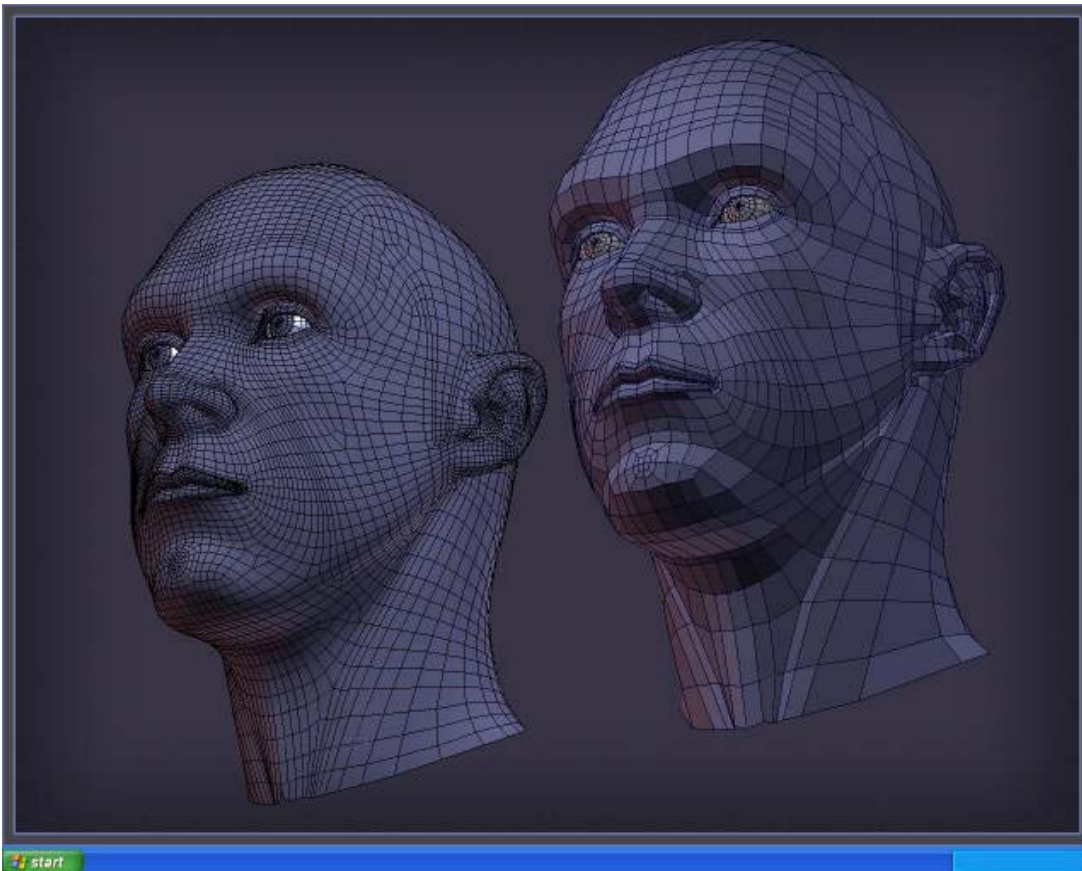
Topology wise this doesn't realy strike a cord with me, but it is a fine example of XT nonetheless. There is XT in the head, and clearly

visible XT in the throath/ mastoid. It is remarkable how the modeler choose to let a loop flow from the chin crossing the mastoid. Here you can clearly see what I meant by the 3d nature of those loops, they don't lie in the same plane, but crosses different planes.

Right now I'm totaly mystified on how those loops are produced using box modeling techniques. I shall experiment and hopefuly I can come with and answer soon. I believe that mastering the XT is an important factor to model any organic shape like a pro.

Last edited by Toontje : 05-24-2006 at 12:02 AM.

#45
05-22-2006, 06:44 AM
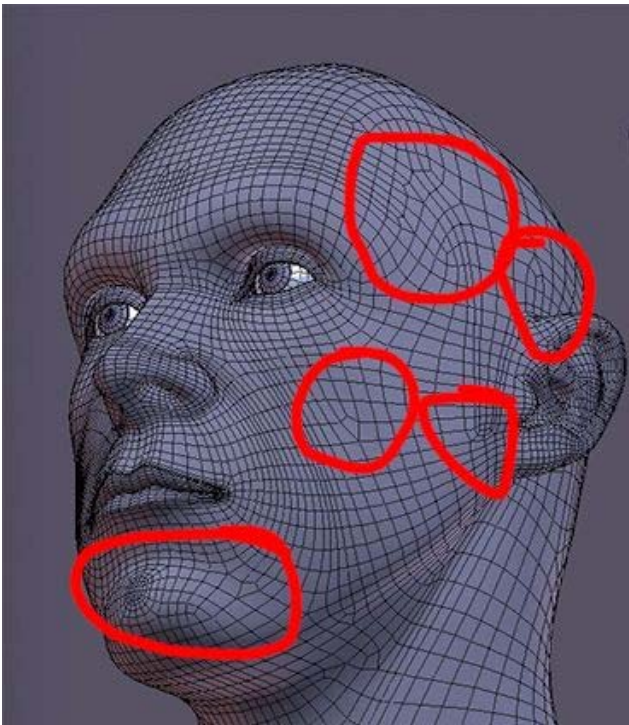
By the look of it my only comment for this one is that the person was/is learning. This is an example of a messy mesh for using Ngons, as you can see you have no control over the Tris the sub-d created.
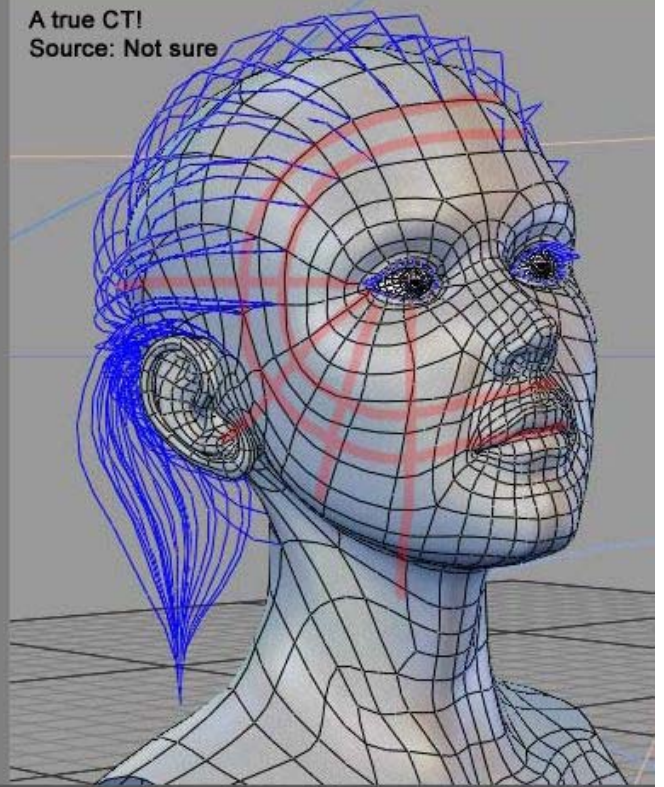
Quote:
 XT is an important factor to model any organic shape like a pro.

Yes you are correct. XT is what a lot of them are using and I'm going to take this post to put you and the <u>readers</u> on the right track so they and you don't get the wrong idea since I didn't make it clear when I talked about XT/CT/ST.

The human body is a very complex subject to model in 3D and when we talk about Topology it's mainly the "Head." Because of this it's wise to come up with names to make things easier (To understand and create). Then later there is Body Topology which is something I haven't really looked into it yet and I'm not really sure if you can apply the XT/ST/CT to the Body but continue exploring because you might find something interesting.
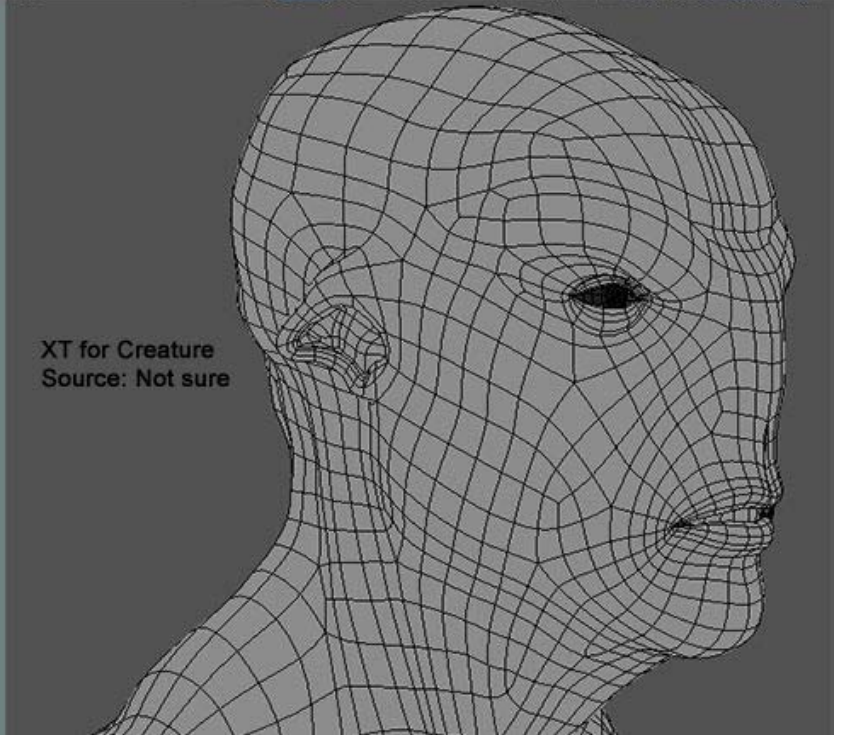
A true CT!
Source: Not sure

source: found at Cgtalk | Very nice & clean XT!
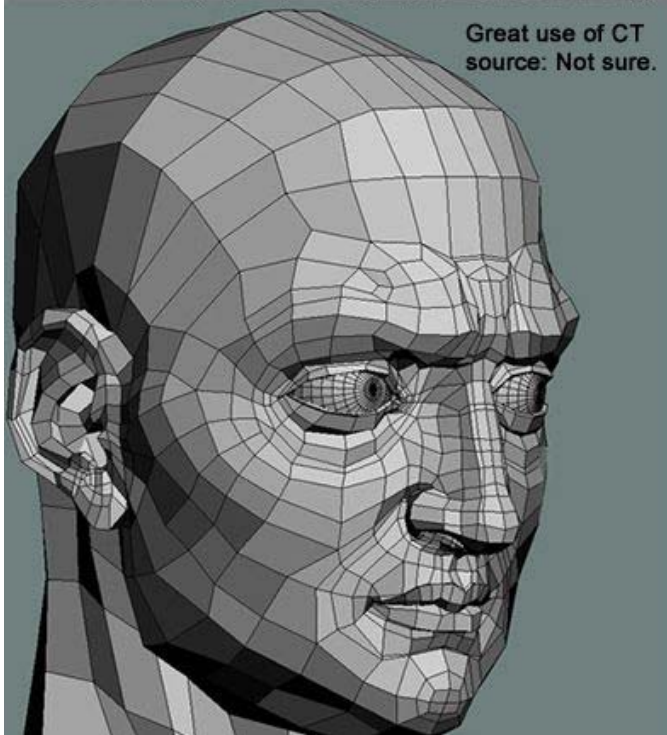
Great use of CT
source: Not sure.

XT for Creature
Source: Not sure

I can go on with wires and marking them but you get the idea. Also, don't worry too much about the neck because once we talk about "EN" + Tweak you will fall off your chair. 🤩

Note: This thread is getting huge and disorganized. I will probably have to rewrite it in the far future.

Quote:

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LowPoly

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SomeArtist

Organic
modeler

Join Date: Jan 2006
Posts: 67

Everything in this thread will be summed up at the end so don't worry if it's confusing.
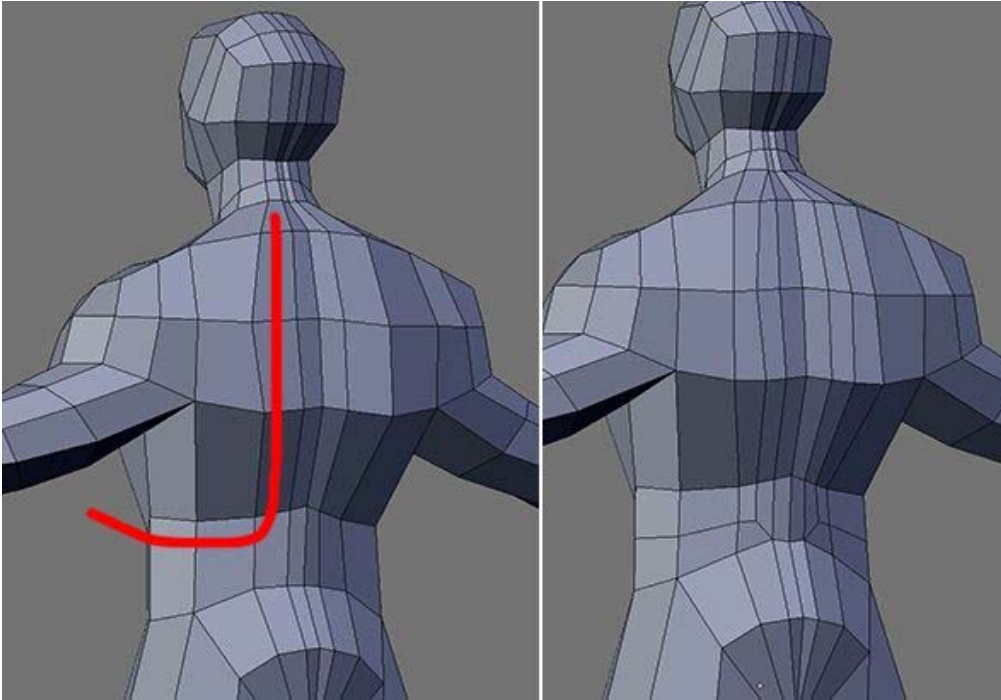
EN the Grid
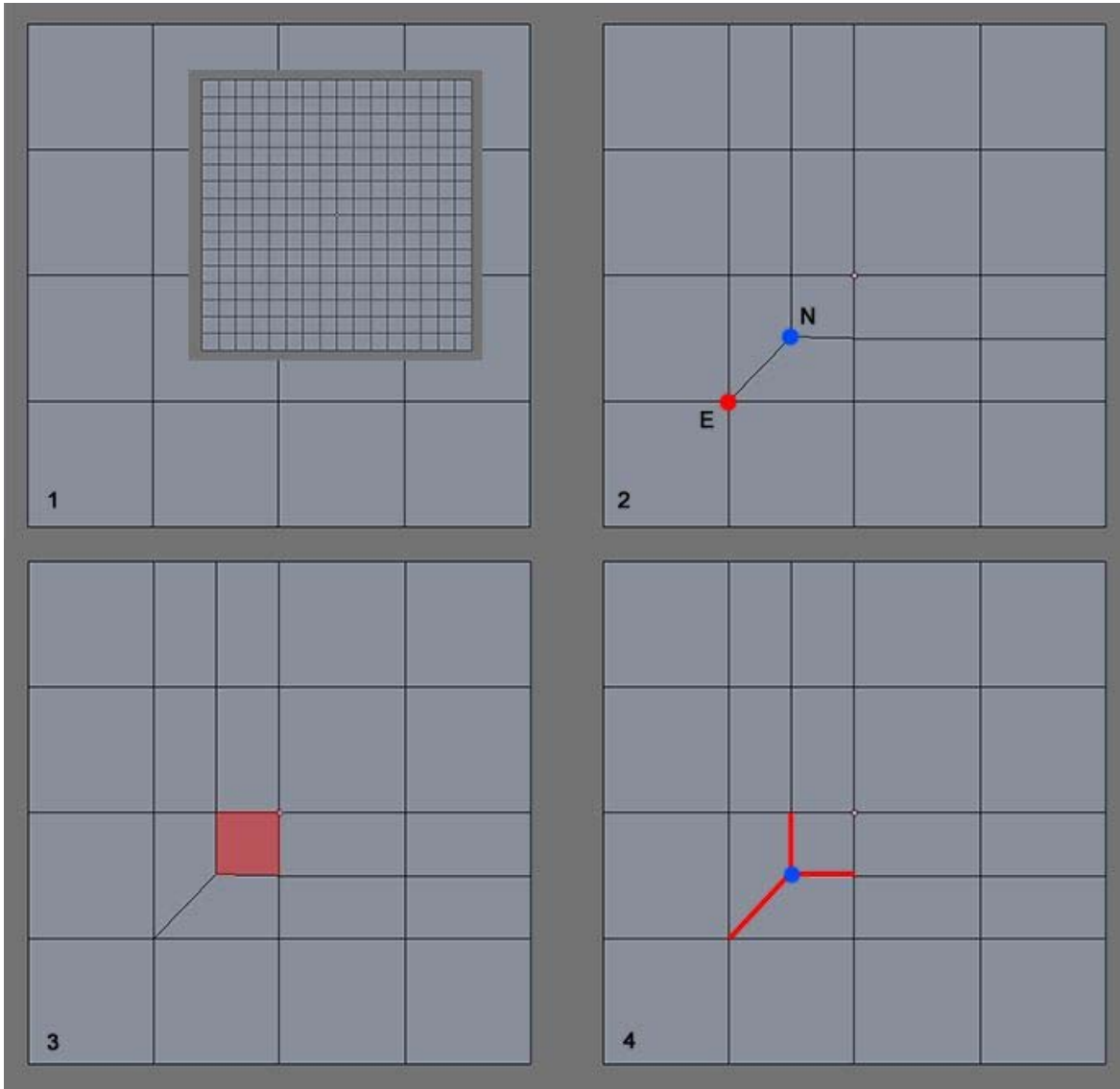
When you create a form your objective is to have a perfect grid this is why it's bad to introduce Ngon/Tris at a form stage because you're not into detailing and for some reason beginners have a habit of detailing their meshs when they're not ready. Look at this diagram carefully because what you are looking at is the answer you have been searching for.

1: You are seeing a base grid (low res) and on top of it is another grid (high res).
2: The E and N, the key to local Loops/Detailing.
3: A very special case (Red quad) that allows you to unpole diagonally (*Breaking the Grid*) if you choose to.
4: A chance to completely make that Npole gone! (Moving it elsewhere that is. There is one situation where you can make it completely gone).

Before you detail your mesh you must have PROPER flows and you do that by "**EN**ding the Grid" (Introducing the E and N because

there is no other way). Also keep in mind that Unpole is not a detailing technique, but a *cleanup and flow-**directing** technique*! Instead of saying "Now where should I unpole?" you say "Now where should I EN the grid?" because that's what you are doing.

**A Demo** – Here's a demo to put things into perspective.

On the left of this image is a perfect grid (The Form) and I draw that red line to show you the flow that I want. On the right I EN the grid to achieve that flow, that's it! That's all there is to detailing the mesh. But wait, it doesn't look like a flow at all! In that case, tweak it, tweak tweak and tweak until it looks like one.
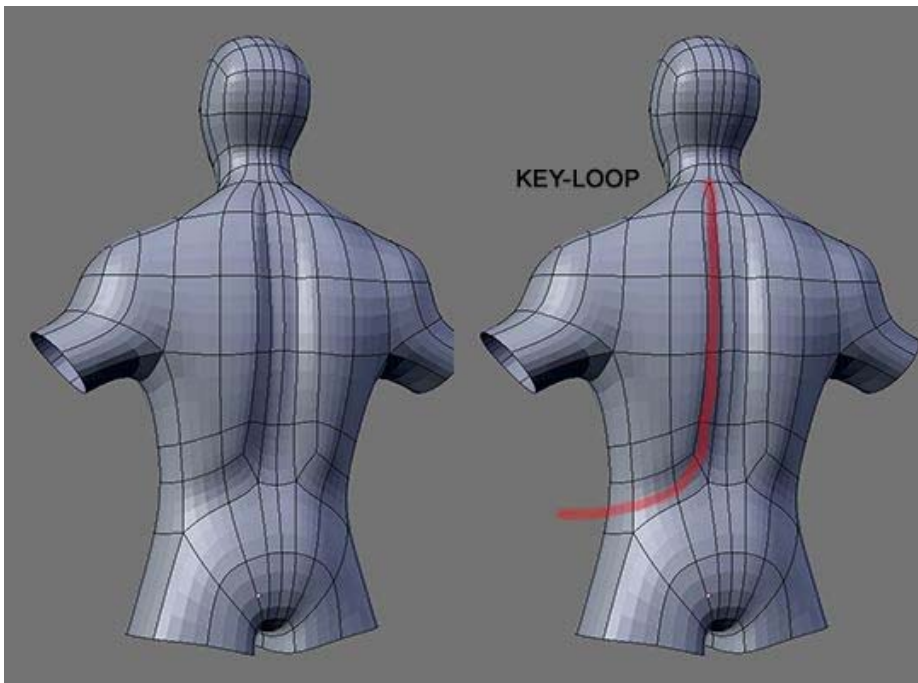

There I have it and now I hear you say "This can't be it. This is too simple to be useful because I have seen professionals create very complicated details on their meshs! With very complicated flows so there must be a complicated solution." Is that so?

Complexity is an illusion because all there is to complexity is simplicities. An artist is not a god and he doesn't make things out of nowhere so now let's complicate things with simplicity!
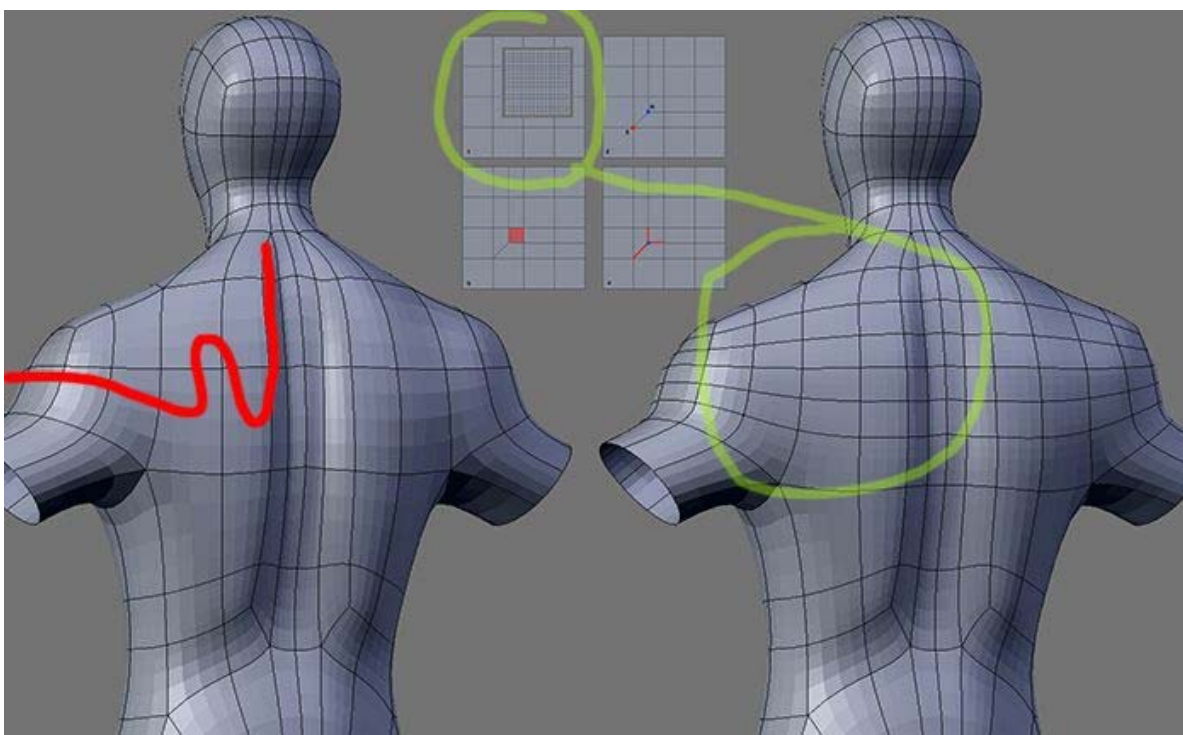
On the left I draw a very complicated flow and to do that you must EN the grid once again but there is a problem. The problem is that the base grid's resolution is too low to have anything complicated so what I must do is increase the resolution (Right, just like painting at resolution 320x240... not big enough to add in super details).
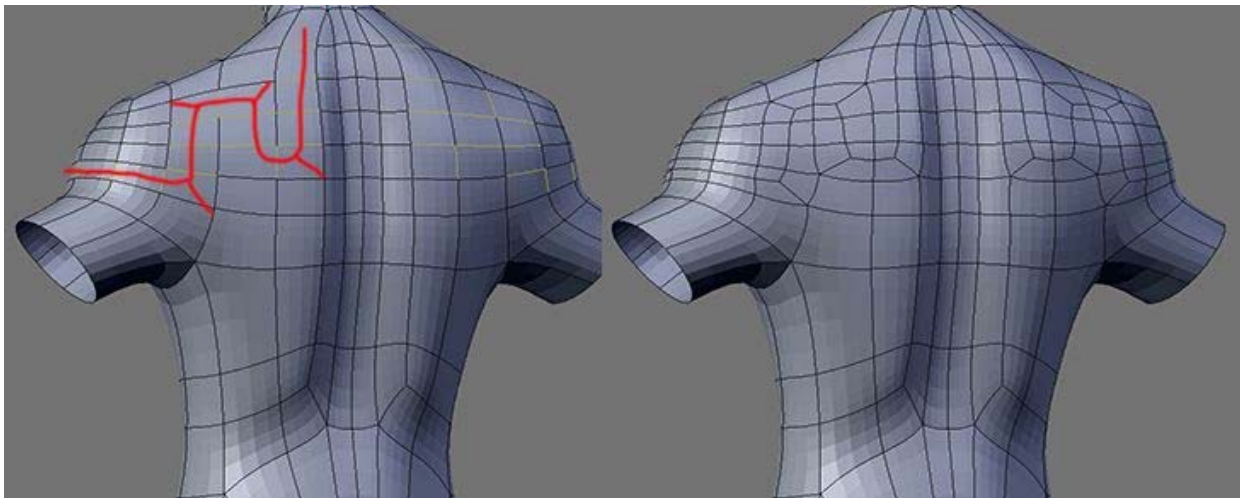
Now I have the flow and you might say the flow that I created on the grid doesn't match with the one I drew! In that case tweak tweak and tweak until it looks like it. One thing you should keep in mind is that you shouldn't always try to match the flow that you imagined because what you are trying to achieve here is a Key-Loop.
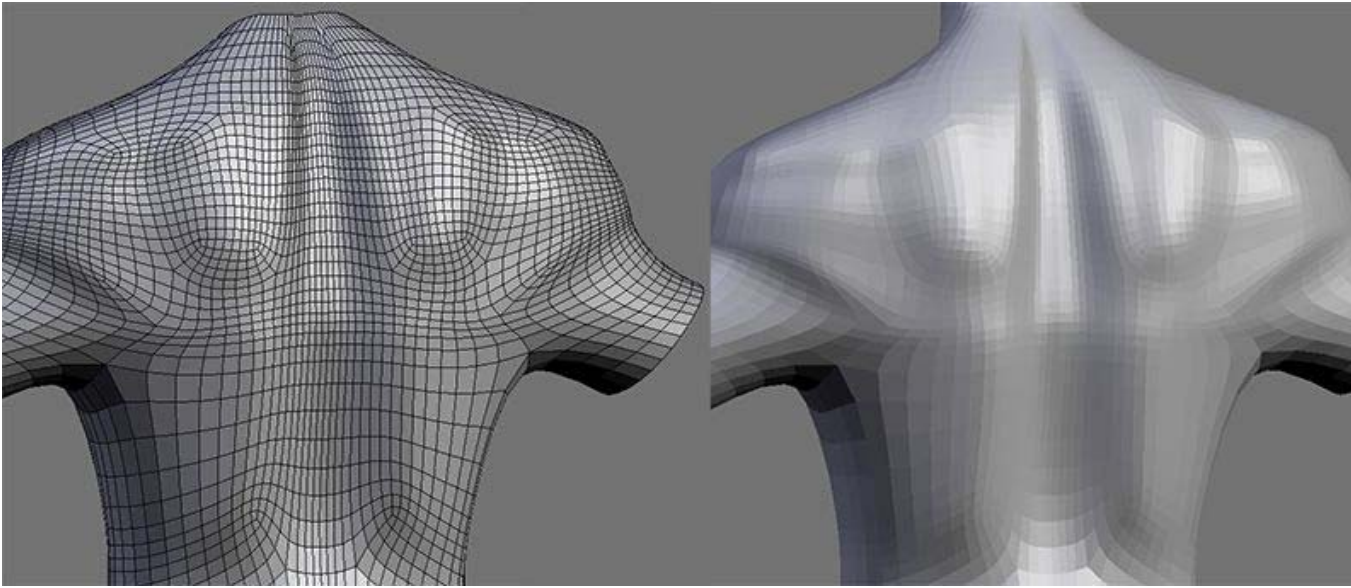
Now doesn't it look complicated to you? Keep in mind that I am not modeling the back of the human body here just using it to demo the flows.

More on the next post and I'll respond to other posts later. (there are 6 images for this post).

Also, maybe Toontje or one of the mods can edit his post to make the image smaller so not to eat up the screen.

#**48**
05-25-2006, 08:43 PM

Toontje
Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 46

Solution to the problem of diagonal topology.

OK, at last I figured out the riddle of cutting through the structure of the mesh without making a mess.

I think that this is certainly an important step in become a profesional modeler!

Let us discuss this hypothetical scenario:
2 models , one by a talented beginner and the other by a equaly talented professional. Let's assume that both model has a nice clean mesh with nice topology.

In my observation and analisys of wireframes, I always felt that even though the form looks correct to the layman, that the beginners mesh lacks the added complexity of the profesional mesh. In my observations, the acid test is when you model a muscular monster. All noobs flunk this test and the professional modelers stands alone here... BUT NO MORE!

What seems to be the problem then? The problem is the orthogonal way of modeling. If you don't know the meaning of orthogonal: to lines that intersect eachother at an angle of 90 degrees are considered orthogonal. So, a regular grid is orthogonal, but say if we take this grid (mesh) and deform is, it still is considered orthogonal (in Euclidian space.. AND CORRECT ME IF I'M WRONG HERE).

So you start boxmodeling whatever (let say a head). Most features you add to your model (eyes (loop), mouth (loop) etc), are done by extruding or cutting. So far this is OK. Those operation adhere to the orthonormal characteristic of the mesh. Loops still flow correctly, there is some added penalty for this introduction of complexity in the form of N-poles and E-poles, but that's ok because by now we know how to use them to control topology.

You keep forming adding form and topology until you hit this wall: anatomic detailing. Here is when most beginners stop, that is why you see so much young female heads only on the net. A young female head is smooth and has little topological complexity. But try to model an old female with wrinkles running across at and angle on her face, certain boney features petruding through her skin, flappy skin, then the beginner is lost here. If you try to cut a mesh with a knife tool, you'll end up with lots of pole and edge & face loops running around your model leaving you with a messy mesh. Some profesionals (like Stahlberg) takes triangles for granted because triangles tend to stabilize or stop the flow of loops.

There must be away to cut through this orthogonal structure without risking a huge topology penalty. My solution is based on the cut/ knife tool (Blender specific anyway... but it could be the same for oter apps). A few post back I shown how to correct a cut made with the knife tool. So I thought, the knfe tool must be useful too to cut diagonal structures. So to my horror, I had to cope with this:
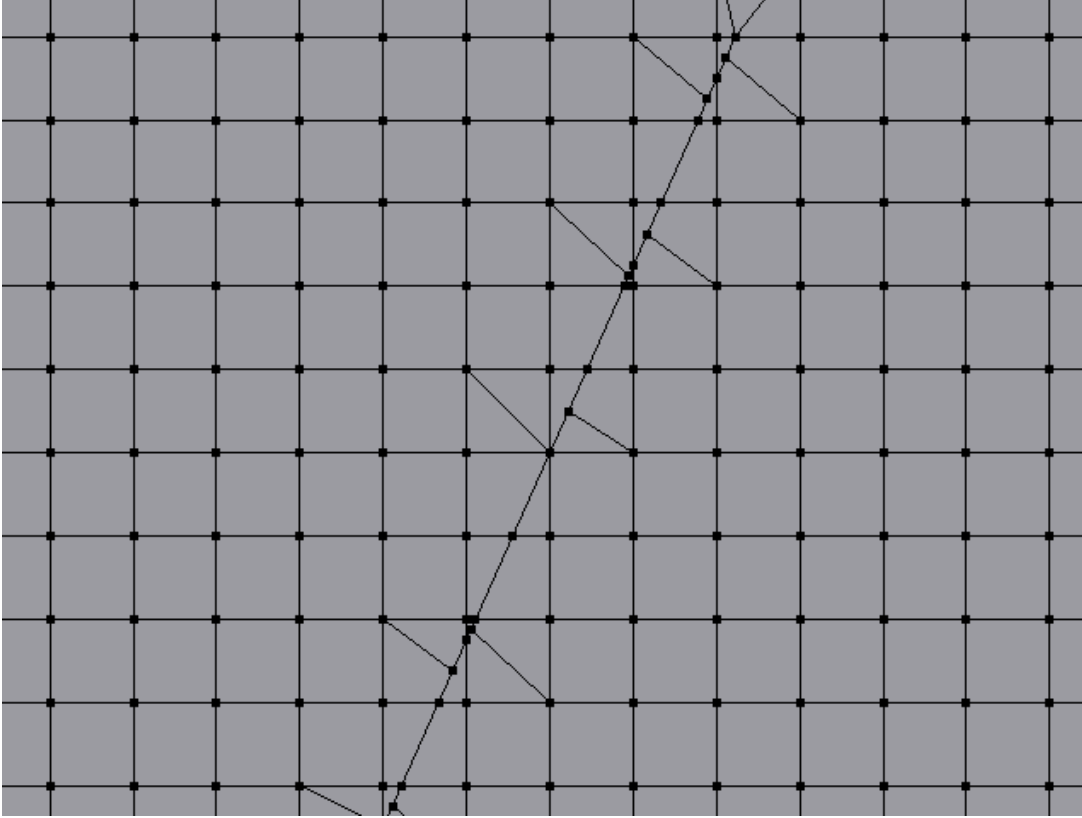
It's a bad topology because there are poles everywhere spawning edge/ face loops in every direction. You'll lose control over your model. But then I corrected this with the method mentioned earlier. After analysing the result, I came to the conclusion that a diagonal cut in your mesh is nothing more than a few breaks in your mesh. It's that simple!!!!!! First I was complaining about modeling the neck area, and I've seen SomeArtist video over at 3dwisdom, which didn't have what I was hoping for. But with this simple technique you'll be adding outrageous anatomical details without disrupting your topology. That's right! Your mesh stays clean!
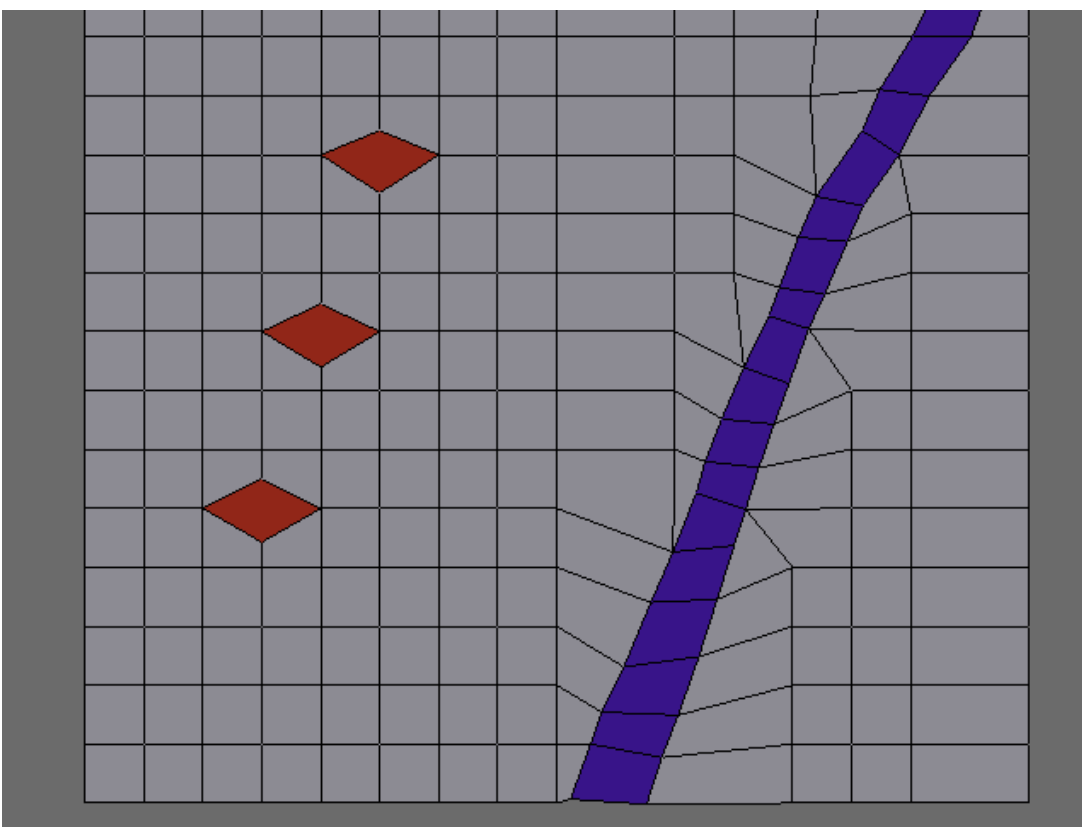
Here you can see in red where I broke/ ripped open the mesh (Vkey in Blender). After tweaking you are left with the blue region. Believe me, this is as clean as it gets! Here there is only **one** face loop: the blue region! There are no other loops, all attempts to find another loop will only select the rows and columns of this grid. There is one small added penalty at the boundary of this diagonal loop (E poles and N poles attached to it), but they are fairly inactive. You can continue to intertwine (thus making complex muscle shapes) by crossing this loops with other loops (Extrude, C-loops or whatever).

Disclaimer: If all that I've said isn't right, then I've just made a Jackass of myself and I'll gladly delete this post 😜

Quote:

Toontje

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#**49**
05-25-2006, 09:37 PM

SomeArtist

Organic modeler

Join Date: Jan 2006
Posts: 67

Breaking the Grid

You cannot EN the grid diagonally it's just not possible so in a situation like this you must break it. Breaking the grid is very easy with the Unpole technique and here's the logic:
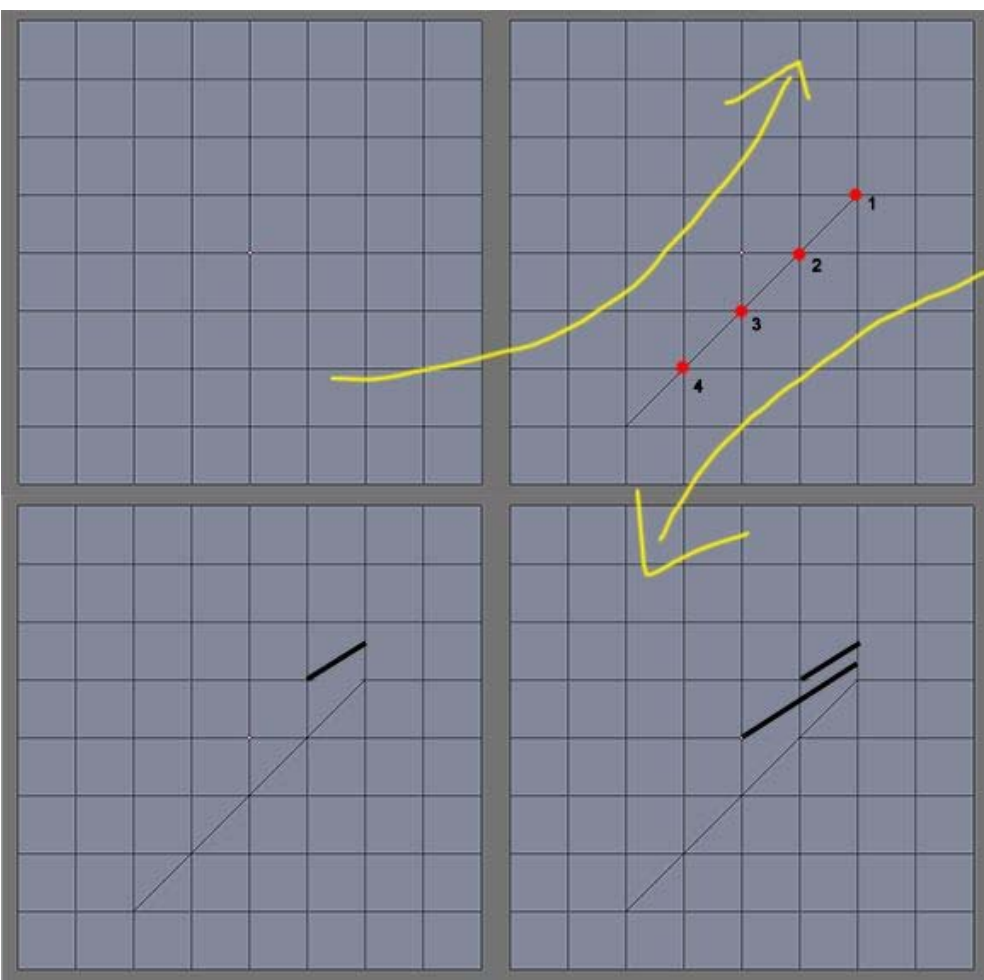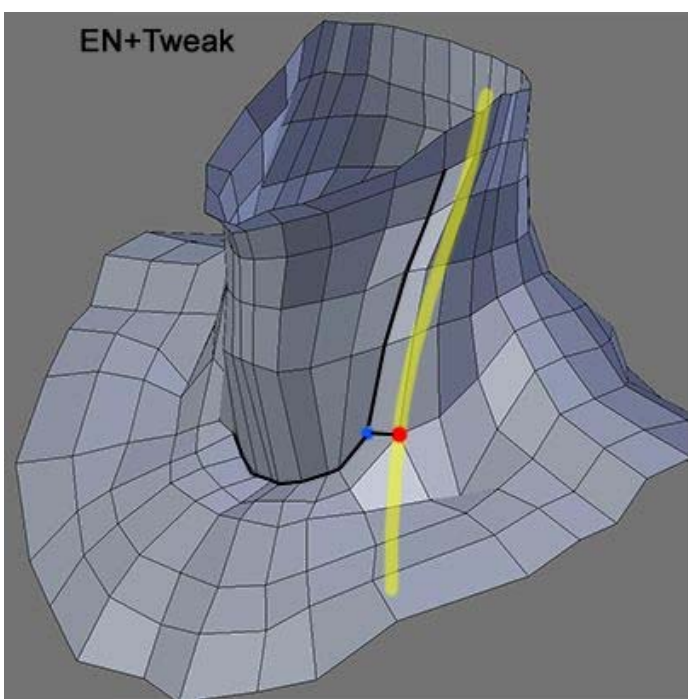
Triangulate the Quad(s) diagonally, in this case I have 4 EPoles after my triangulation because I decided that that's the length of my flow (The more poles the more unpole you have to do).

Breaking the Grid

can be unnecessary because the end result is that you are unbreaking it! Clever tweaking could have avoided this.
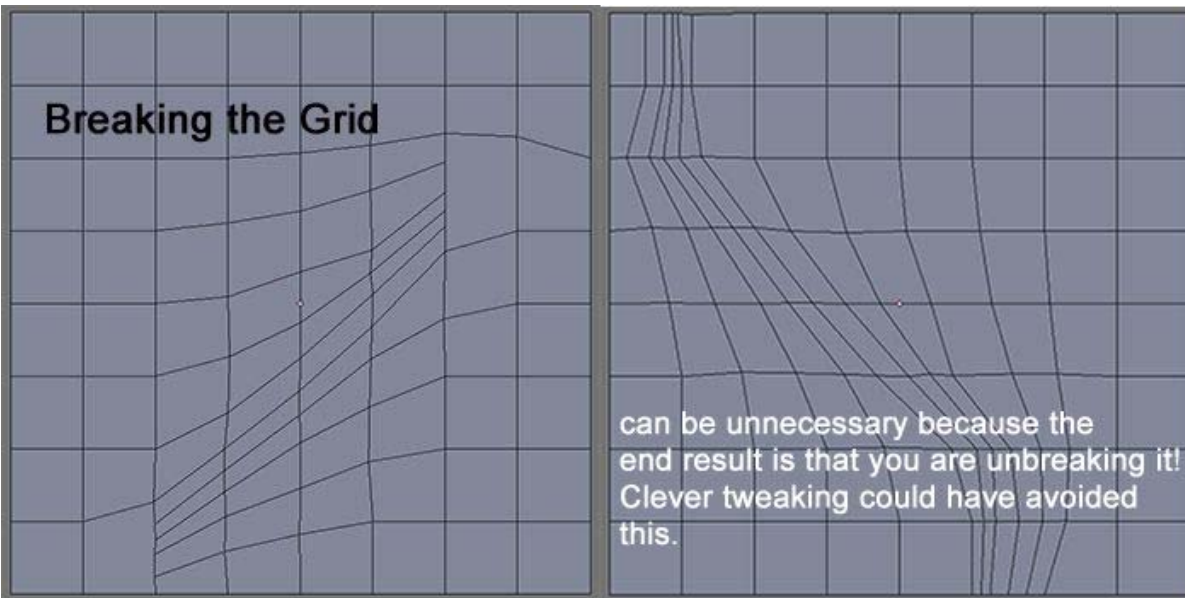
To show you how unnecessary it can be here's a Neck example:

EN+Tweak

At first I break the grid and then found out that it was not necessary since I ended up with what I started with, now I simply EN it and tweak.

Breaking the grid (diagonal flow)
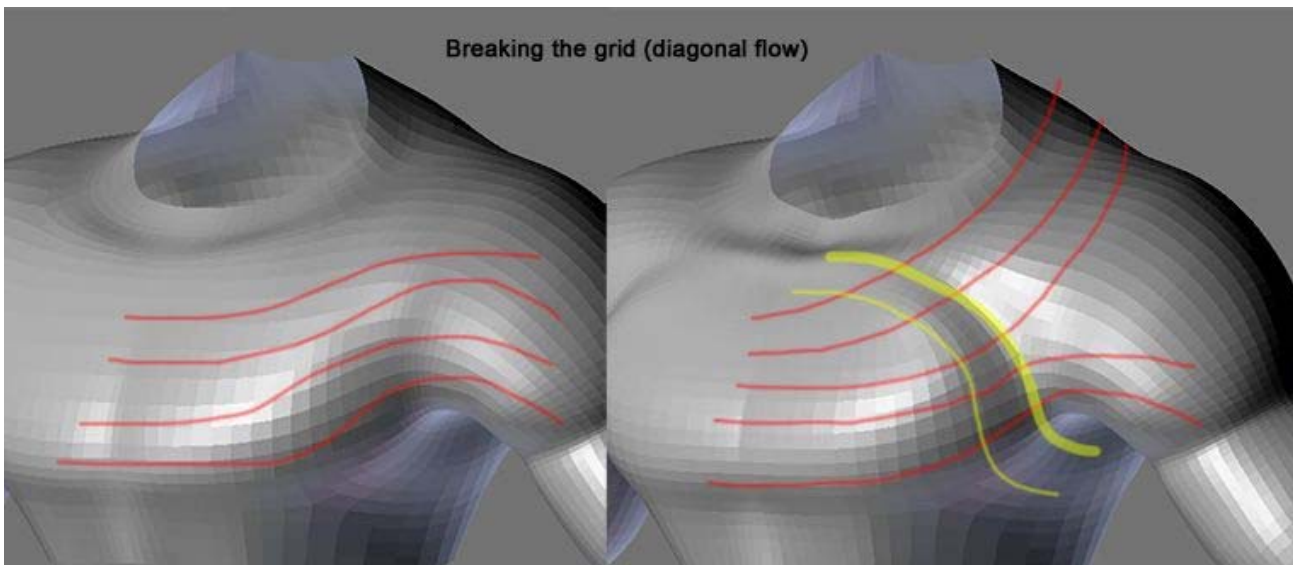
Sometimes you have no choice but to really break it in a situation like this one (I'll post the lapse at my blog later). When you break the grid beware of the Spiral effect (Spiral Loop, more on this later).

Quote:

OK, at last I figured out the riddle of cutting through the structure of the mesh without making a mess.
I think that this is certainly an important step in become a profesional modeler!

Yes you are seeing it now. Also your last image is very interesting because I never thought of diamonding the Vertex to achieve a flow!

Quote:

So you start boxmodeling whatever (let say a head). Most features you add to your model (eyes (loop), mouth (loop) etc), are done by extruding or cutting.

Correct and then from there on you unpole/spin edges so that the loops blend in with each others. If that's not enough you can move poles around. More on this later... Organic is an interesting topic. 😊

The Pole - Page 6 - Subdivision Modeling

Toontje

Join Date: Jan 2006
Location: Bonaire N.A.

Bachelor/
Ingenieer

@Lowpoly
Sorry that I didn't answer your post .The hobbit tutorial is kind of unorthodox. You asked about blocking out the form. What you need to do is don't follow the tutorial literaly. Heck, even the author won't be able to recreate the exact same form if asked to model it a second time. Then you should take a cube, subdivide a couple of times and move vertices around untill you have the rough shape. I think it would be a good excersize for me too to model the hobbit later on.

But first.....

I was about to talk about the first method of breaking a grid. Let's take the mastoid as an example again (and I really hope I'm not about to reinvent the wheel again 😊):
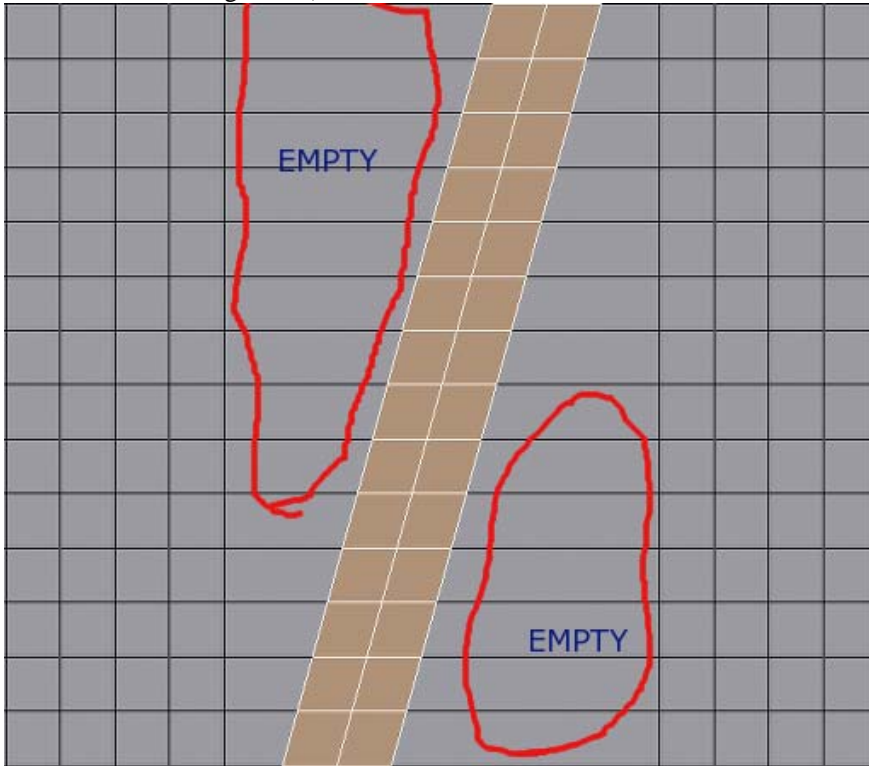
Those two empty areas are just too empty to shape the diagonal loops out. Some topology should be inserted here. There are a couple of ways to do this. It all depends on the situation (like a wise man said once). The first two examples can be seen in the following image:
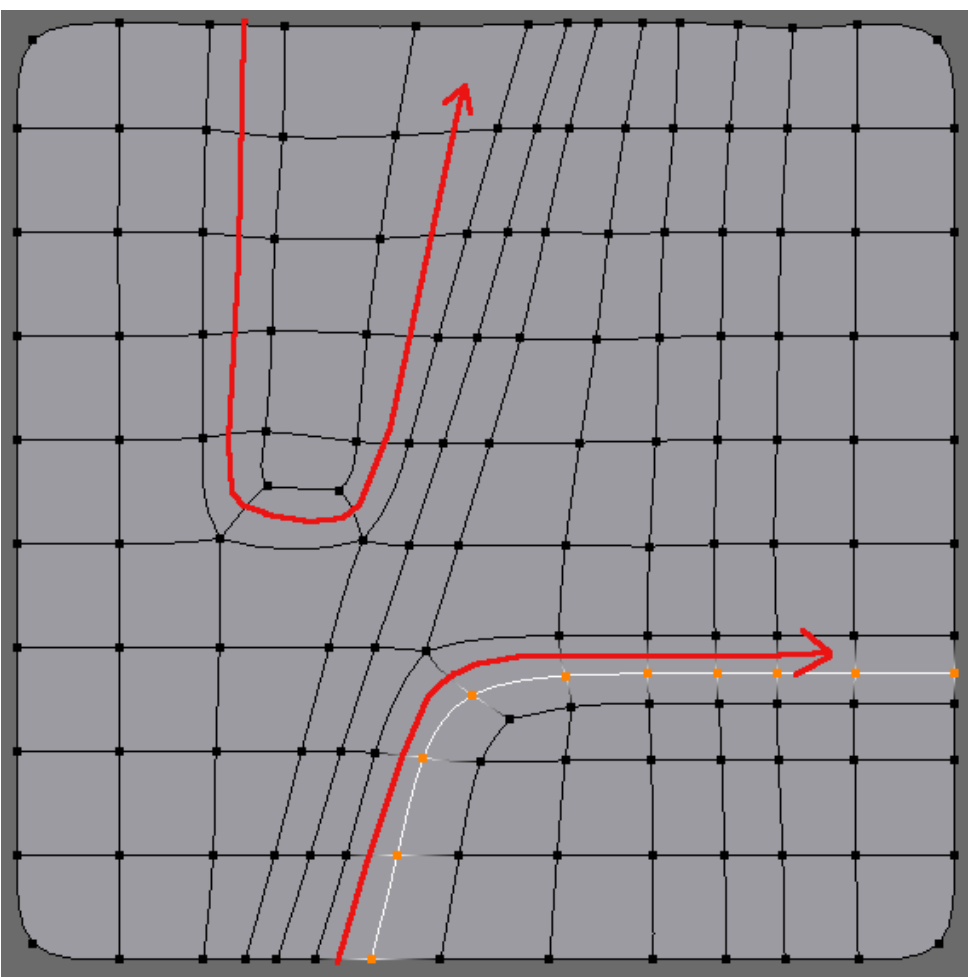
The upper loop is contained within the empty space, and the lower loop crosses the mesh. Note the none of these loops crosses the diagonal target.

Of course you can cross the target too with an added advantage that there are no poles attached on it. Like you could use a single cut to fill both spaces :
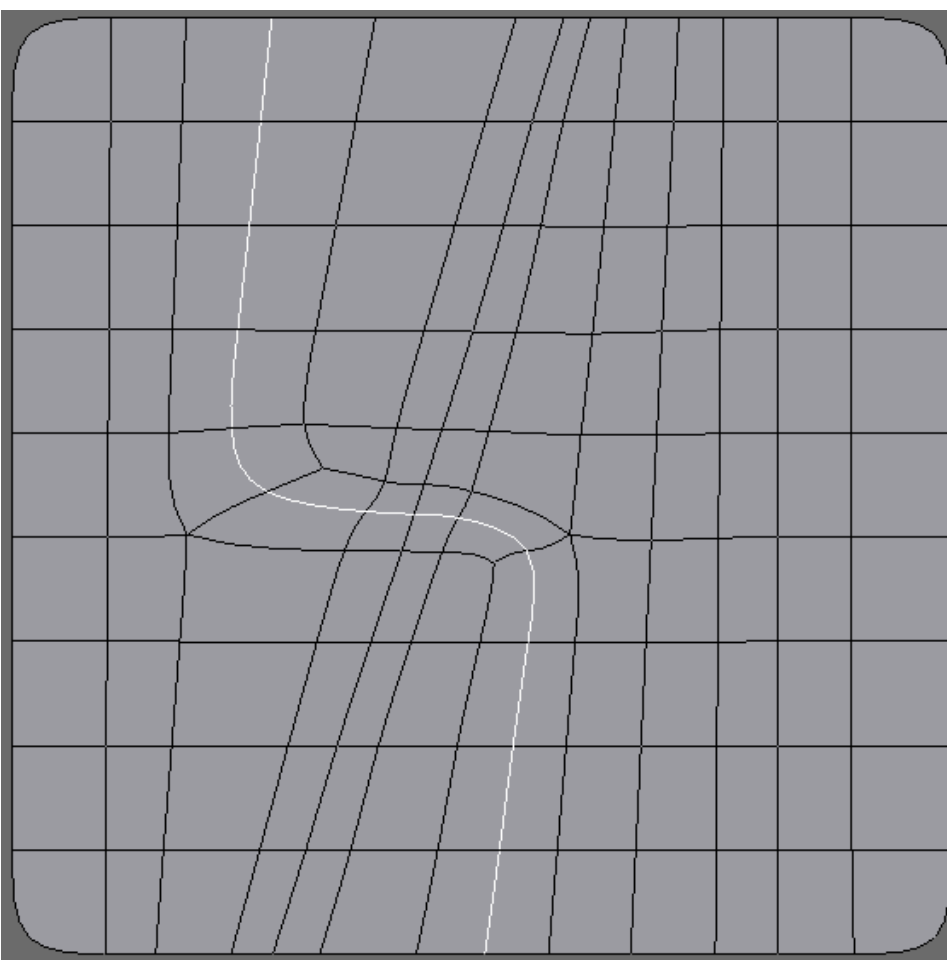
I must confess I don't find it very atractive, but you'll never know......

Here are some more examples of how the loops may cross the mastoid. The upper loop could be used to form that vein on the mastoid.
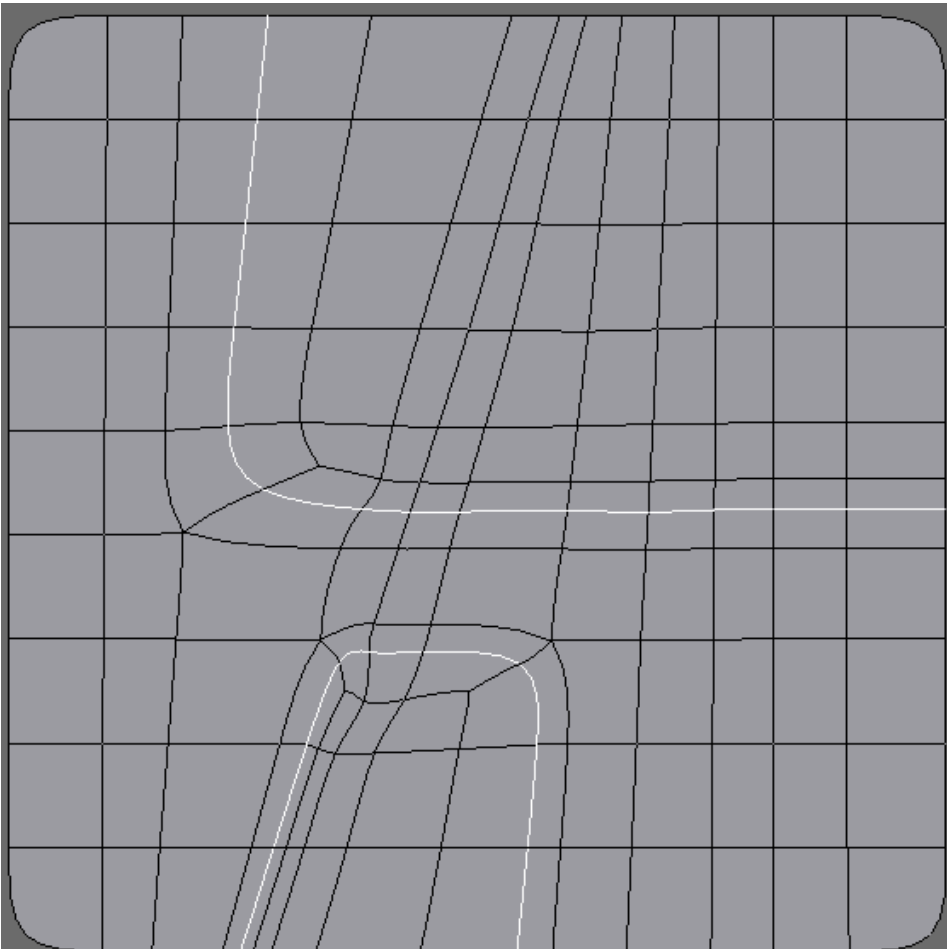
#**55**

The Pole and The Tweak is your gateway to become a professional modeler and what have been said in this thread is the key to model freely, let me demonstrate with an Ear.

There are two ways to model an Ear:

1: Model separately and attach it later.
2: Model it from a box head.

Some people prefer #2 because they feel that by doing #1 they are not real artists! Well, in that case here's the Logic that allows you to model freely and once you know this logic you can create monsters' Ear easily.
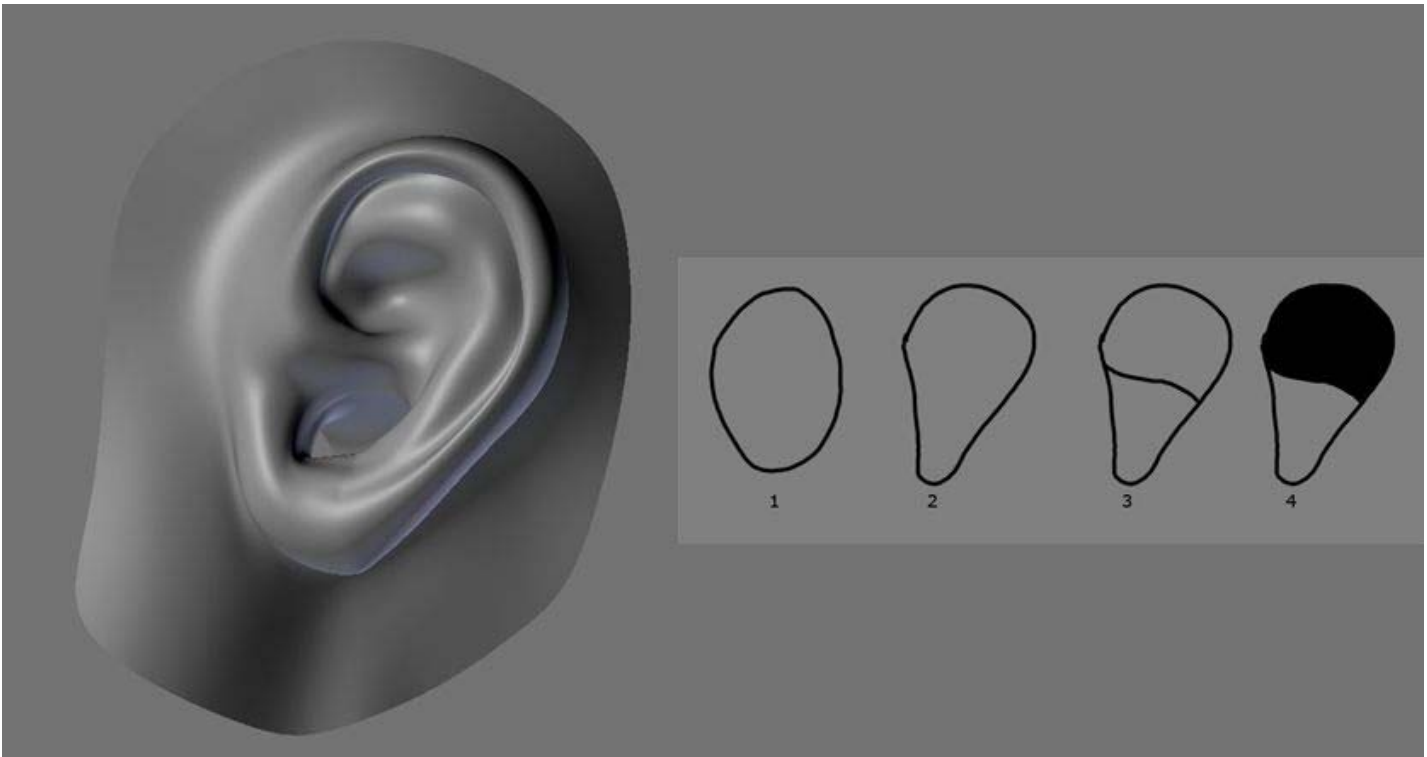
1: The Ear like the Eye/Nose/Mouth starts with an Extrude which gives you an *Extrude Loop*. The logic then is to turn it into a Spiral Loop (after step #4).
2: Whenever you extrude something you should always tweak it afterward! (Tweak the Extrude Loop so it looks like an Ear from the sideview).
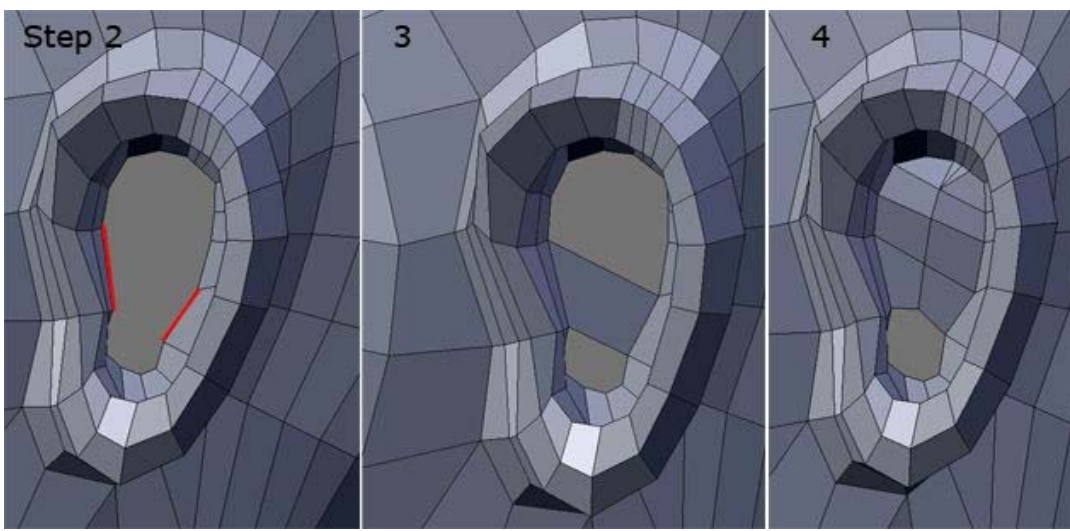
Step 2: It doesn't matter whether the edge on the right is up or down, just connect it because you can always tweak it afterward if things don't look right.
Step 3: Now that you bridge the two simply fill the top hole and leave the bottom the way it is.
Step 4: You are now ready to TWEAK/SPIN EDGE and UNPOLE and add in more edges as you go.

Don't forget to use Wire and image references.
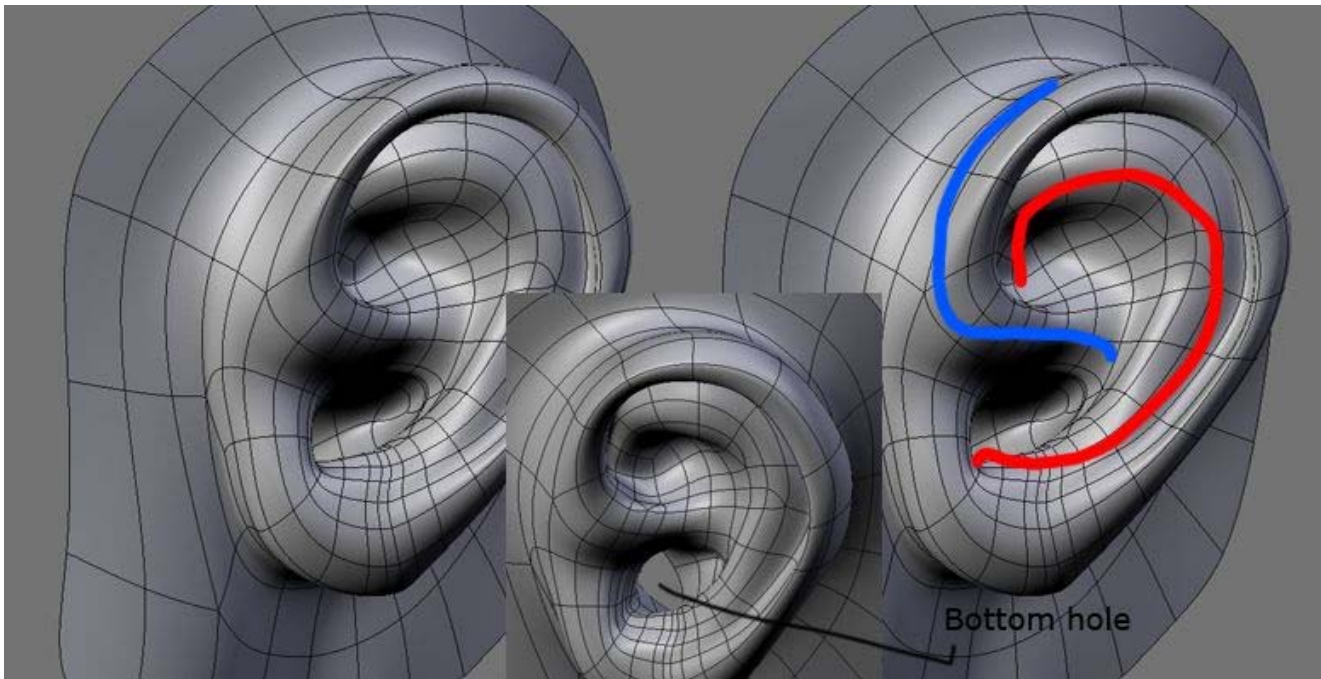
You should try to make your ear look like this rather than a "Realistic" Ear because this is good enough, beside you can always come back and refine it and make it better! Now the reason why I don't show you a step by step is because I am not into "Step by step". Whenever I model the topo is always different, it's like drawing on papers - I dont' think, I just do it. You should do the same instead of looking for step by step try and look for the logic because once you understand the logic a step by step is not needed.

You do not need to know Ear's medical terms/Anatomy/fancy diagrams, just get good references/wire and tweak!

Ear's Logic in Wings3D

You can't make a hole in Wings3D so here is what you do.
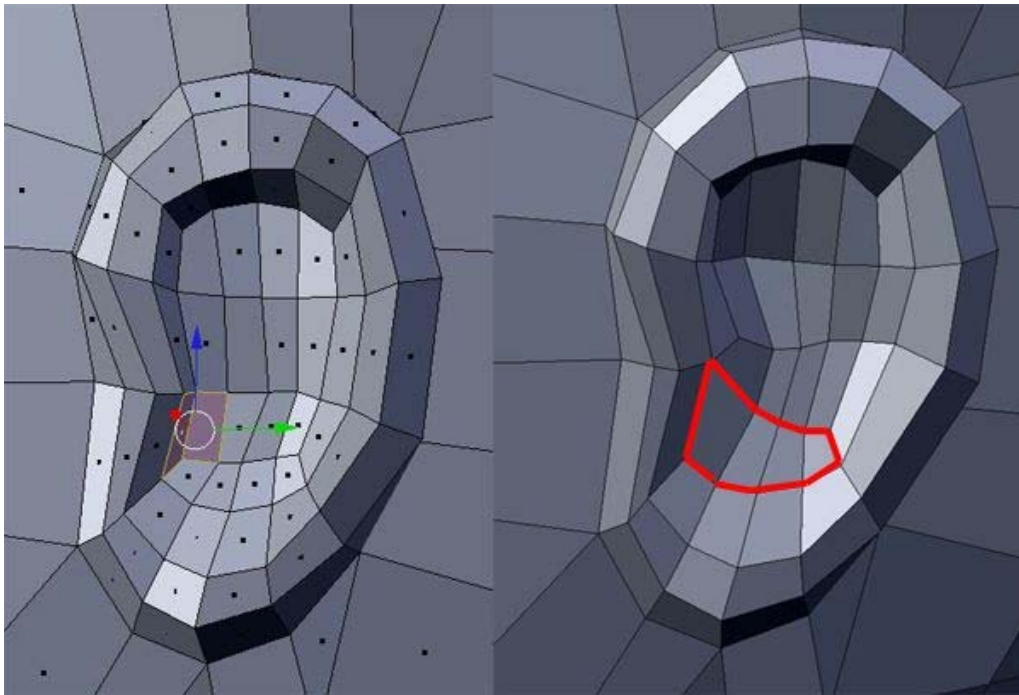
A spin edge operation is performed at the bottom left of the inner extrude and from there Unpole to look like the one on the right. Now just extrude it INWARD. Again do not be slave to this step-by-step because the logic is clear. It doesn't matter whether you spin edge or not! Do what you must to get to the logic and work from there.

Nose's Logic
Ear's Logic
Mouth's Logic
Arm's Logic
Buttock's Logic
Knee's Logic
list goes on...

Now that you know what you're searching for 3D Modeling is 1 more step easier. To go back in time I would say the logic to modeling a human figure is The Form! Once you have the form you work from there and that's the Logic. Without the form how can you do your studies? Without the Ear's logic how can you model the Ear? Logic and observations come first and then the rest will be taken care of by the **The Tweak** and **The Pole**.

I'll get back to other posts later.

Quote:

SomeArtist

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#**57**

SomeArtist   Join Date: Jan 2006
                                                                                    Posts: 67
Organic
modeler

Ngons = Custom Brush:

Using Ngons is like using Custom brushes in a 2D Painting program. Custom brushes allow you to get special effects that are very difficult with the traditional painting brush and sometimes it get the job done quicker than the normal painting brush. Beginners learn to paint with the Painting brush, not custom brushes so in a way this thread is teaching them to master the Painting Brush because Painting

Brush is <u>the standard</u> and all programs support it. Once they mastered the Painting Brush they then can go and explore the Custom Brush.

In my opinion, a program that does not support Ngons is better for beginners to learn and explore 3D because they don't have to worry about Ngons. I have actually put my philosophies to the test by teaching it to someone who have never done 3d before. First I tried Wings3d and it didn't go too well because he kept on questioning the "Ngon" thing and topology/flow was a big problem so I decided to use Blender and it clicked for him. Now the only thing he has to worry is Triangles and nothing more.

I think future 3d softwares should have an NGon mode where you can turn on and off. By default it should be OFF so beginners don't have to worry about it. Once they gain experiences they can turn it ON and just so all the readers know, the reason why Blender is lightning fast is because of its Triangle/Quad environment.

SomeArtist

Organic
modeler

Join Date: Jan 2006
Posts: 67

Fill-Loops + Tweak
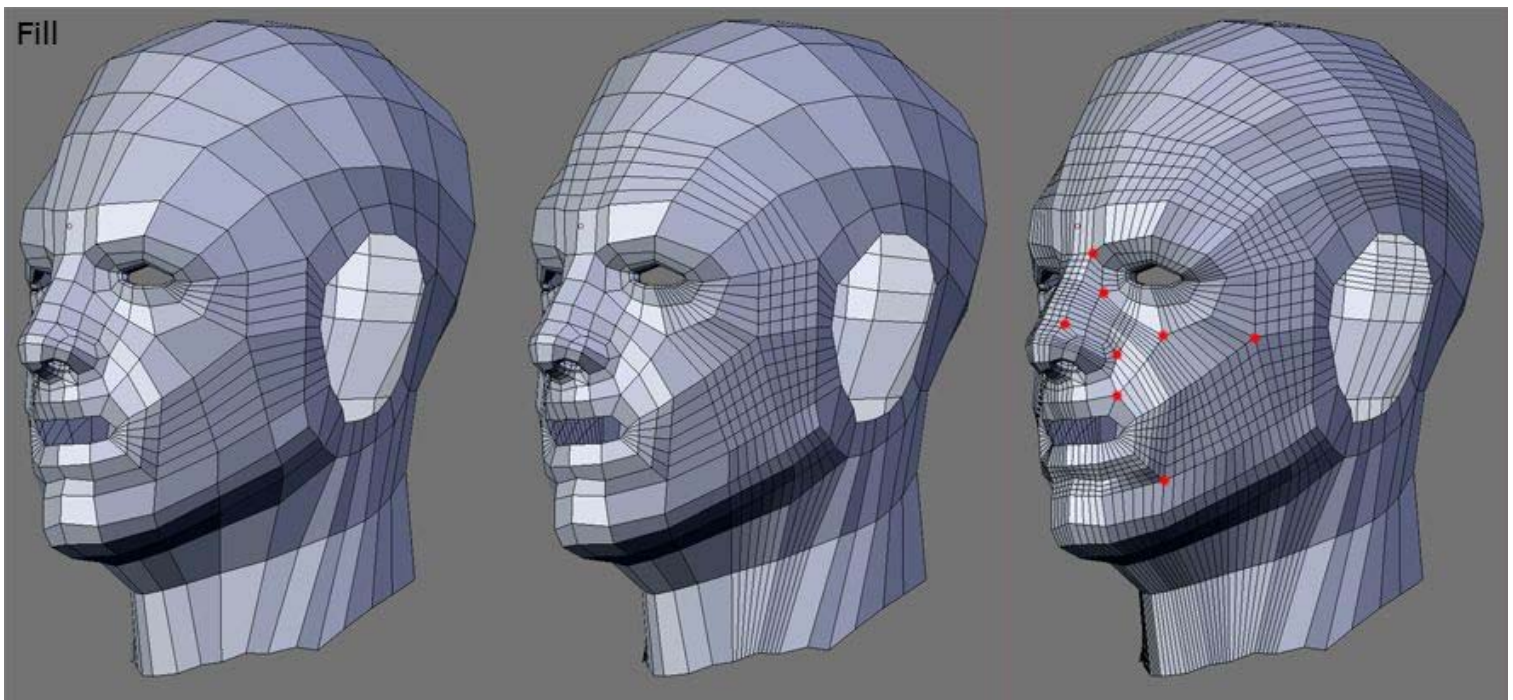
The fastest way to model a human head is to model all the key-loops first and then tweak it into the right shape of the head. Once you have all the Key-Loops you can easily fill in without worrying about anything because all the Poles are already in the right place.

Note: Subsurf filled the entire head automatically!! Now that is the power of Key-Loop!
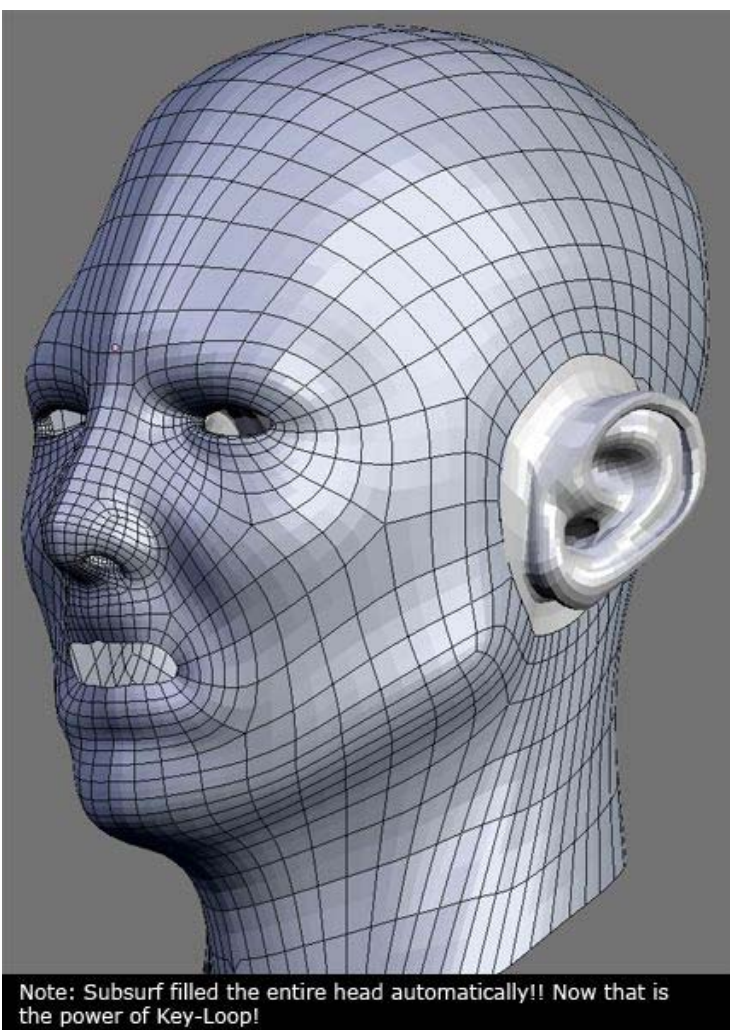
I decided to let the Sub-D take care of the Fill and with the soft-selection mode on I quickly tweaked. As you can see, you can get professional results just by using the XT or CT (XT in this case).

Very confused about Head Topology
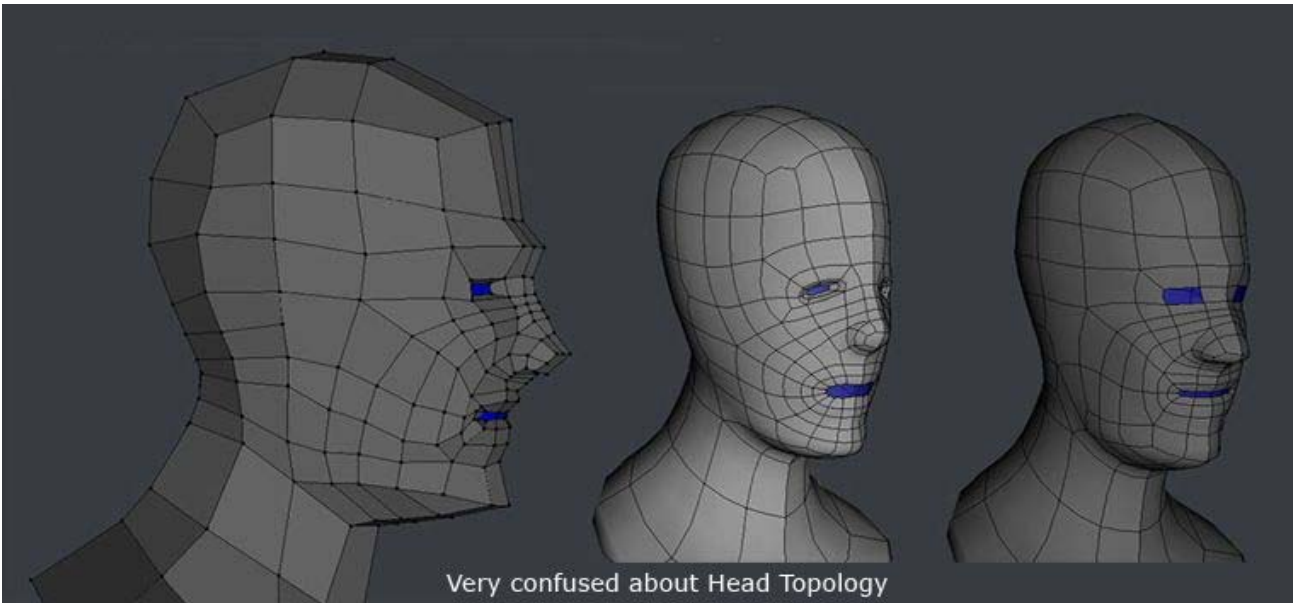
This was last year and I was very confused about the head Topology because I didn't know anything about Poles/XT or CT.

Highres to Key conversion

The Key   The Fill
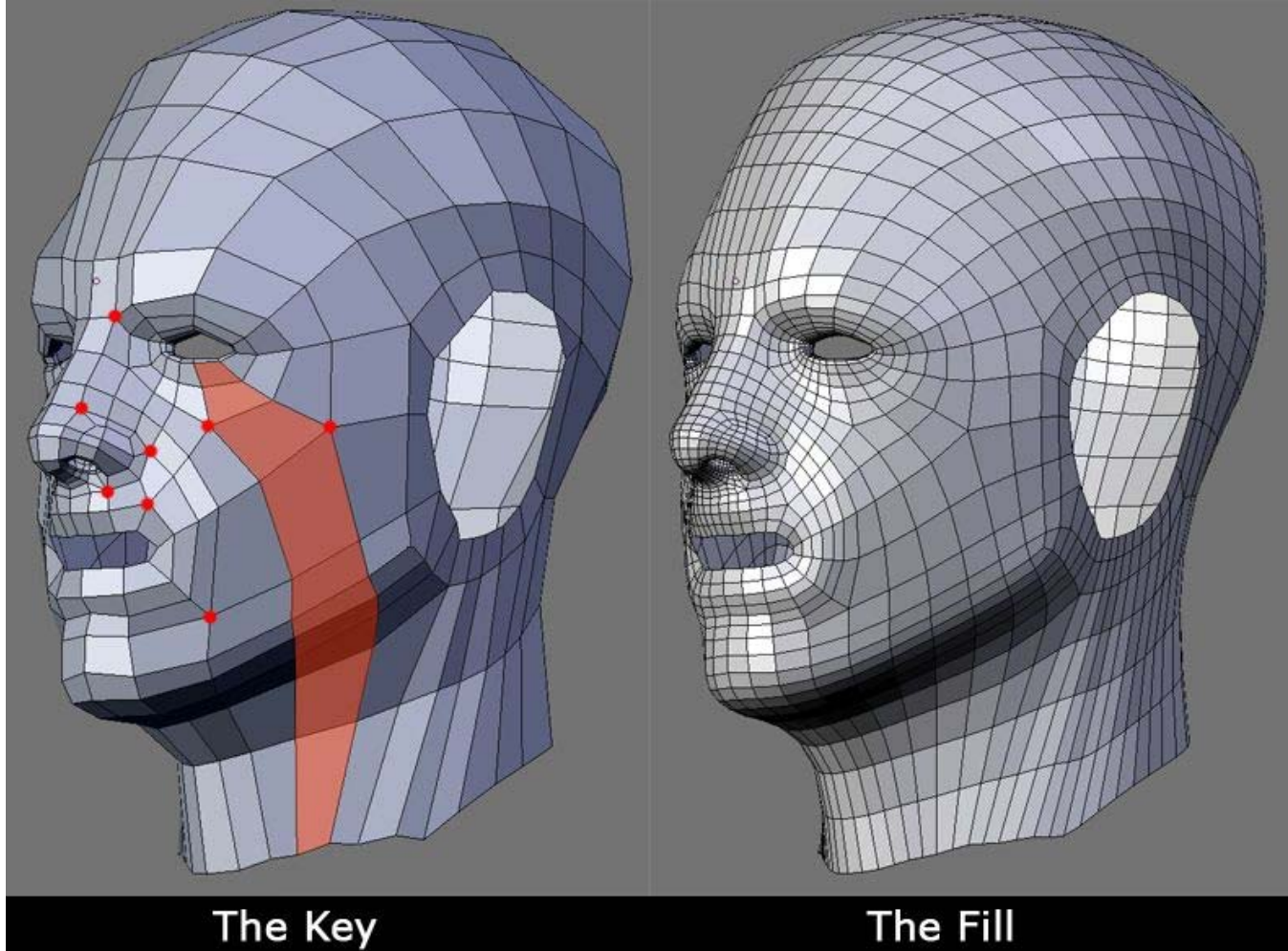
Turning a Key into a highres model is very easy, just let the Sub-D do it. However, turning a Highres into a Key takes a bit of work but it's not impossible and I will show you the mindset later.

Note to Poly-by-Poly Modelers: Just block out the Key-Loops, since you're not into Forms, and let the Sub-D take care of the Fill and Tweak away. 🙂

The Pole - Page 7 - Subdivision Modeling

SomeArtist

Organic
modeler

Do not be intimidated by Gollum as I'm well aware that a lot of beginners are frightened by it whenever people talk about "EdgeLoop". By giving something (that we're afraid of) a name and a concept it takes away the fear and things become EASY.

SubD - Fill <----------------- CT Key <------------------ CT Highres
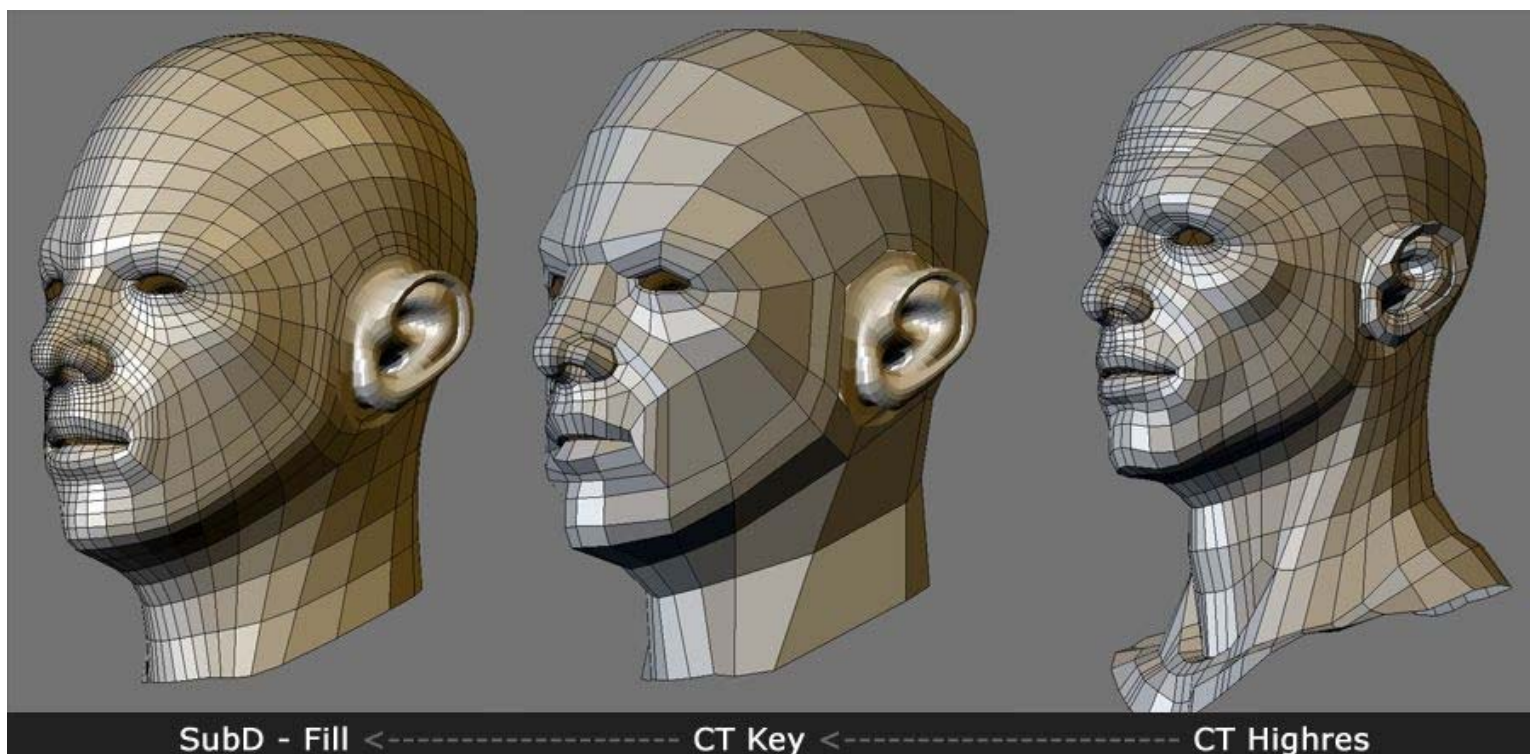
The ability to convert a highres mesh into a key mesh is important because if you have access to free models you can dissect them and study the KEY LOOPS! Collecting a lot of wireframes is good but bad if you don't dissect them and study the Keys that are in there (This goes to all types of models excluding Non-organic).

Fill   Key
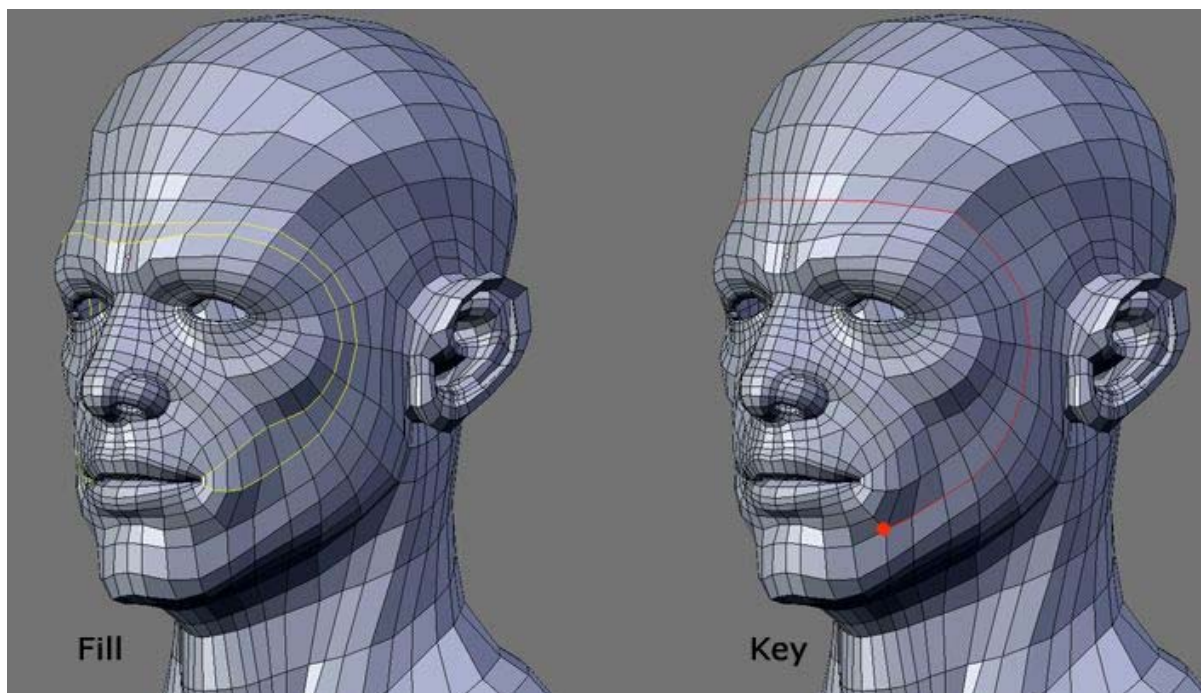
The logic is *very simple*: The KEY(or Source) **is** The Pole. So, to turn a highres mesh into a Key mesh is to remove all the Fills! A Fill is an edge edgeloop that is not connected to a Pole in anyway, if it's connected to a pole then it's a Key.

Here's what you do:

1: Locate all the Poles on the mesh so you can get an idea of where they are (In Wings3D you can do this with "Select by" I believe...).
2: Delete all the edge edgeloops that are not connected to a pole.
3: What you are left with is a low-poly version (The Key/Topology source code).

Note: This might not work if you use Ngons/Tris so in a case like this you can say the mesh is MESSY.
Note to 3d programmers: With this logic you can code a better poly-reduction algorithm!! Please do!

Once you have the key what you do is entirely up to you. You can:

1: Save it so you can reuse it later by Filling in. OR
2: Use it to create other heads/creatures ect.. OR
3: Share it with others so they can study that Key and improve their meshs.

How to Protect your Keys
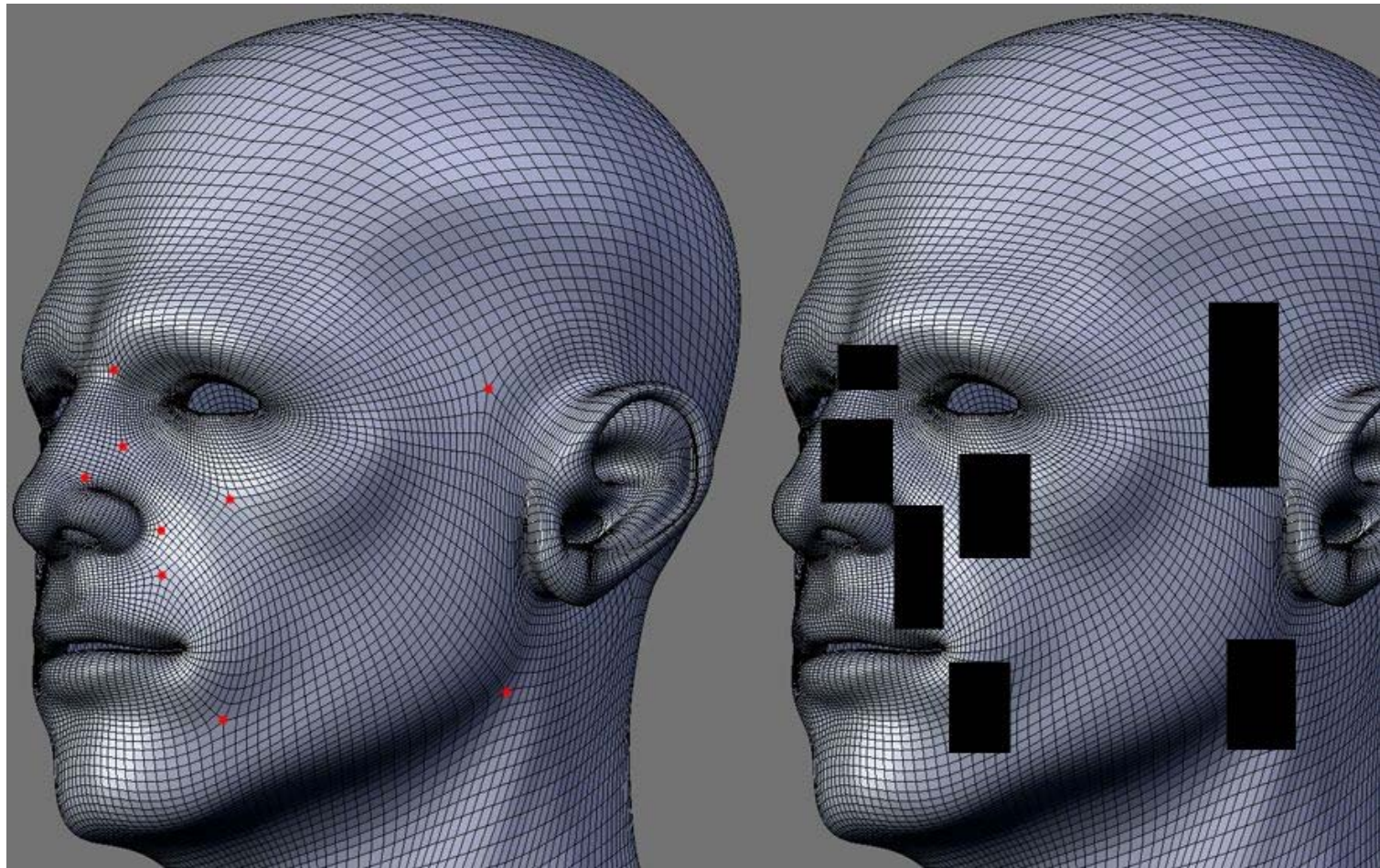
To protect their keys what some people would do before showing their wires to those that asked is subdivided many times, unaware that the poles = the source so it's pointless really. If you really want to protect your keys just black them out! This is a joke but it proves how important Poles are now.

Now back to your curiosity.
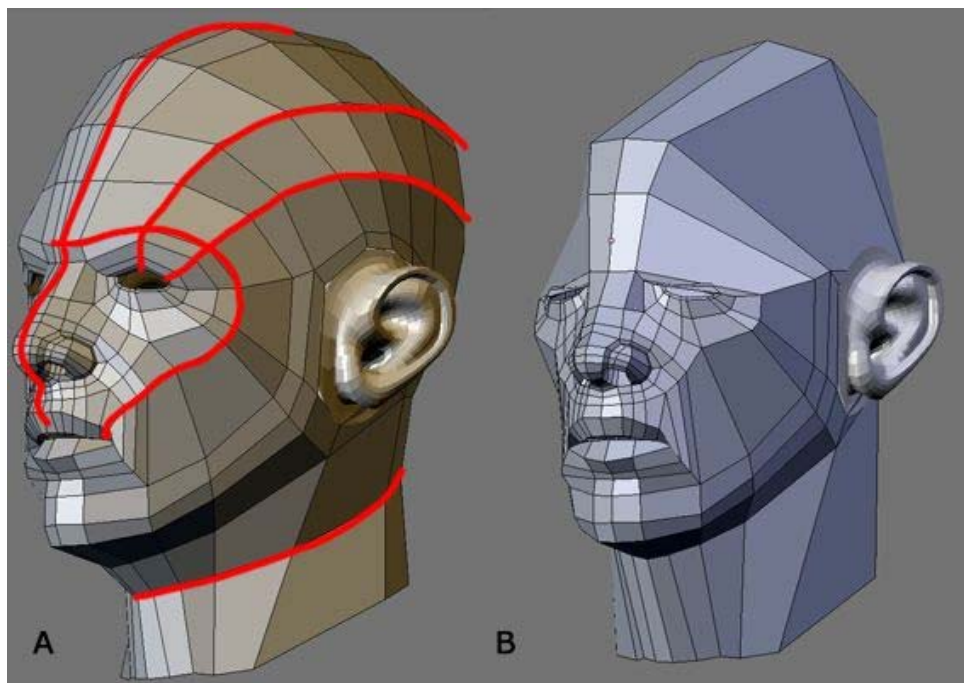
A: Looking back now to the image earlier in this post you might say WHY are the edge edgeloops (red) there? Shouldn't I remove them completely since they're not connected to a Pole? Well yes I can but if I do that it will look like (B) so I decided to leave back those Fills to reserve the head form. It's optional and I would say use your judgement when you do this.

Sorry for breaking the flow of the discussion, we were talking about breaking the grid and then suddenly back to Key/Fill Loop. I thought that this is important so I decided to throw it in before it's too late (I will bring this up AGAIN in the next thread).

SomeArtist

Organic
modeler
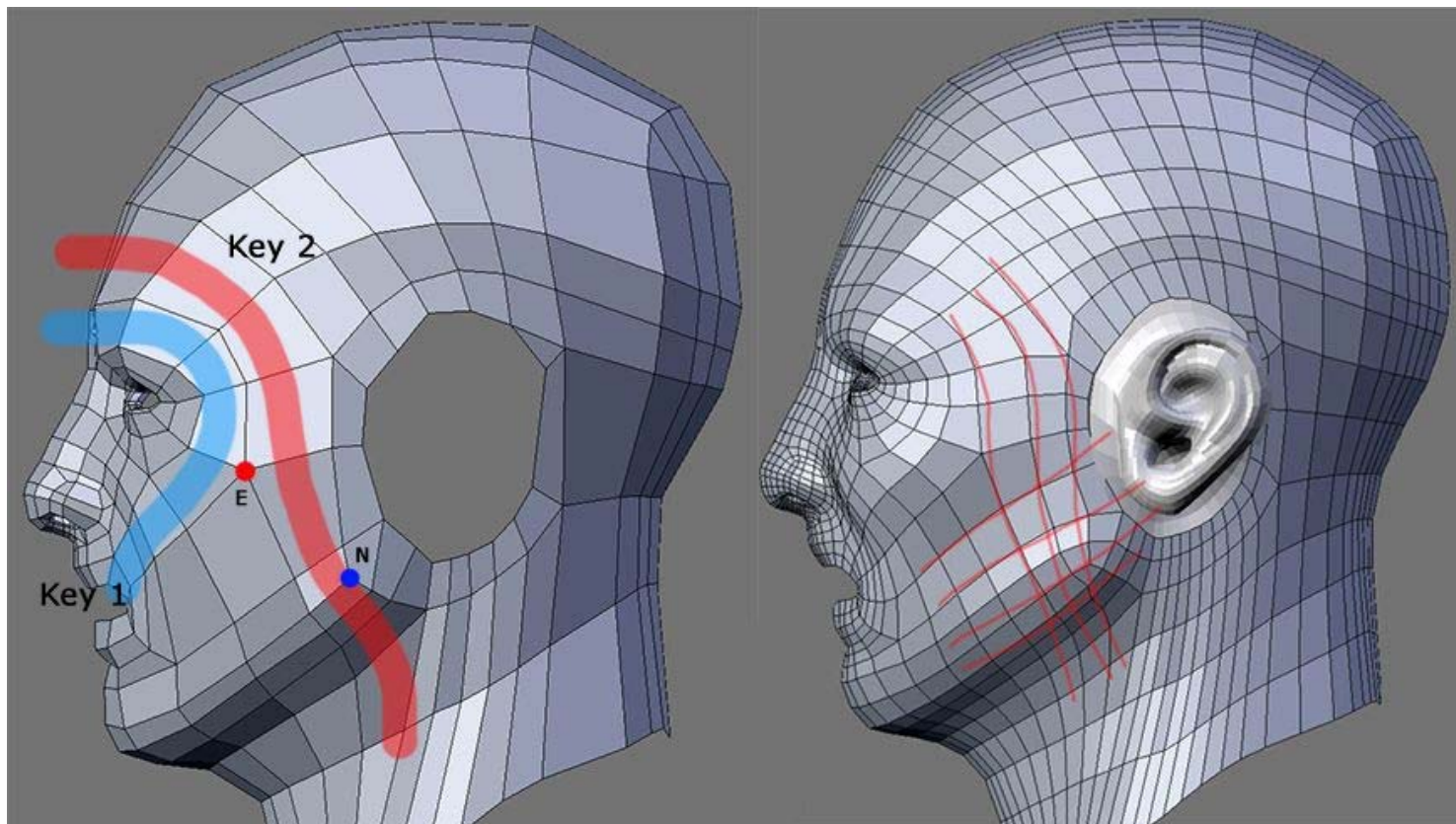
Forming the XT

Key 2: Instead of forming the C by letting it flows right into the Mouth you just go straight down. You will get 2 Poles as a result so you see, poles are not bad after all. CT and XT are all you need and from there you can adjust and adapt. Looks like I won't be using the CT for realistic heads anymore after this thread is over. The problem with the C Topology is the (Jaw?) I find it very difficult to control that area of the head and maybe this is the reason why a lot are using XT since the grid makes it easier to tweak and define that area because of the Npole.

Ngon/Triangle

There are two types of Ngon: Ngon with Pole(s) or without.
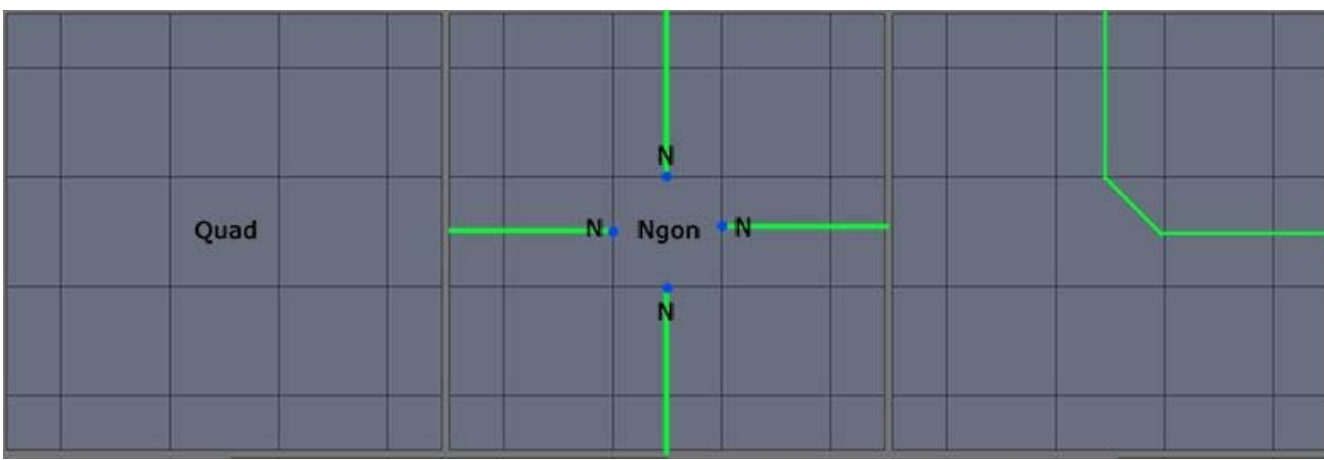
Ngon and Npole both starts with the letter "N" (coincident) and things just got easier because of this. Instead of looking at surfaces (Quad/Tris/Ngon) we're going to look at it from a Pole(Point) perspective because when you manipulate/deform a mesh you are manipulating the vertices/poles, not the surface (or face) itself.

Just to complete the naming:

QPole = Since the Q looks just like an "O" (Organic) we should call a vertex that has 4 edges connecting to it a Qpole (Q=quad).
Xpole = 6+ Edges connecting to a Vertex. X = not wanted or bad.

So in total we now have: X, E, N, Q
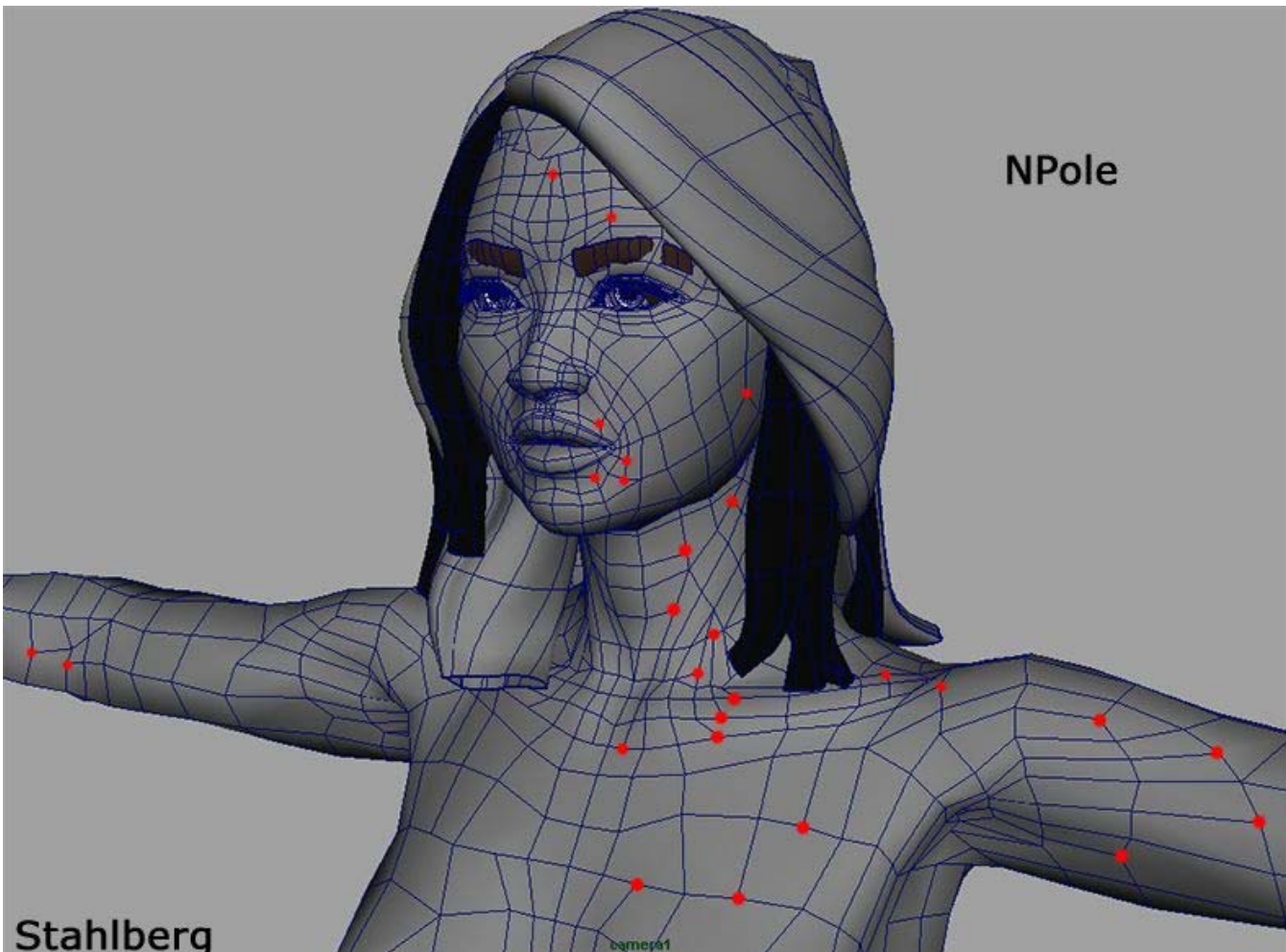
When we talk about Ngons the name "Stahlberg" comes to mind but do you really think he models with Ngons? The answer is NO. If you really think deep about it, it makes perfect sense to say that he models with Npoles.

When I look at things from a Pole perspective I don't care about Ngon/Tris/Quad/Edgeloop anymore because it makes perfect sense not to think about it. We have been modeling with Poles (ENQ) and the surface that we get is the result of our Poles' placement and the kind of Poles we use. Obviously, for truly round surfaces we use Qpole as much as possible and it has been said that having good and nice looking Topology doesn't mean it will deform correctly, when you model from a pole perspective you don't think about

Topology/EdgeLoop/Quad/Tris/Ngon. A model deforms correctly not because it has nice and clean Topo or (quads) but because the poles are in the right place. When it comes to texturing, Tris and Ngons don't cause problem the pole does and how you place it. I haven't looked into "The Bone", "The UV" yet so I will save this for future.

There are many ways we can look at a pole:

1: Poles are bad because they create non-smooth surfaces.
I was at this level before and nothing make sense. It was frustrating yet somehow I knew that Pole is the answer.

2: Pole for Flow
Looking at it from this level things are starting to make sense but people still argue about Ngons/Tris/Edgeloop... So...

3: The Pole
This will answer it all. At this level you don't think about the surface (Ngon/Quad/Tri/Edgeloop) but The Pole (this doesn't mean you should abandon #2). The Pole and many of it together make up the surface so when you control the Poles you control the surface and it is at this level that you will come to understand Stahlberg and the power of an Npole.

There's more to the E and N Pole and I'll talk about it in the future for now do note that E/Npole is used for terminating EdgeLoops (assuming that you are looking at it from a flow perspective).
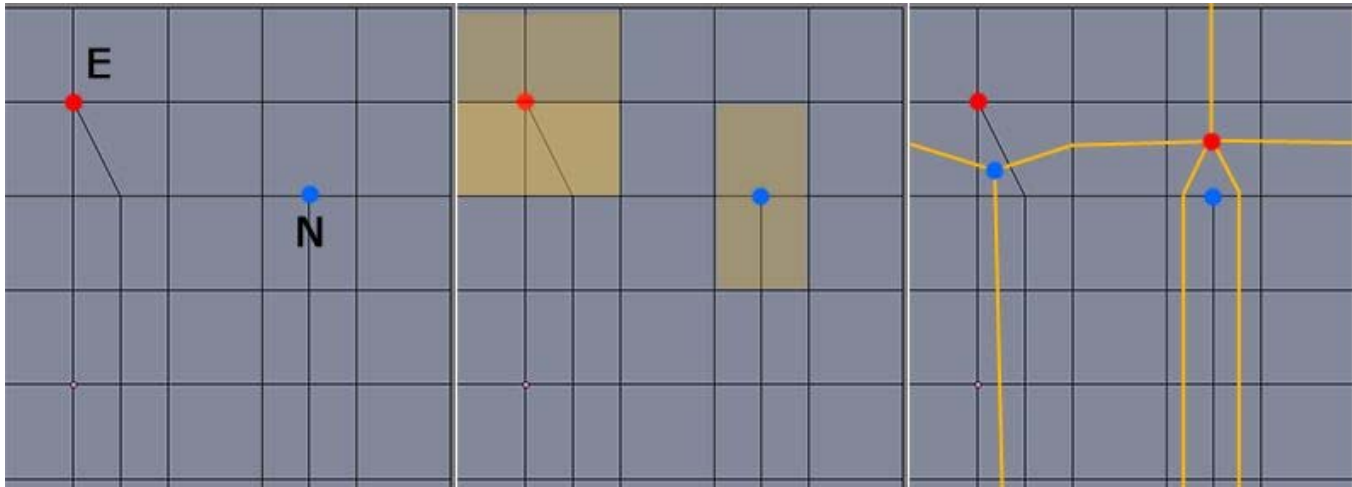
For local detailing and mesh optimization perspective I prefer the Npole(Ngon) since it gives greater control over the Epole(Triangle) – image above. I'll get back to breaking the grid again after this.

@elGordo: The back is not important since it's just a skull. I'll try and get a screenshot for you at a later date if you're still curious.

Last edited by SomeArtist : 06-17-2006 at 06:52 PM.

`Quote:`

SomeArtist

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Quote:

I thought that the XT topology was when there is a horizontal edge loop cutting the head in half between the nose and the upper lip.

If both of us were to say the letter "A" out loud we both would sound very different but we still know it's the letter "A". This thread teaches you to recognize XT so there is no need to be exact since you will modify it to fit the head you're modeling anyway.

Quote:

I think that we should have a talk about mesh density too. When applying more detail, in which direction would you like to cranck up the mesh density?

Mesh's resolution and Optimization was planned. This thread could be very long since I talk whatever comes to mind regarding pole/topology.

Quote:

But I now discovered this (and you brought it up when you where talking about strokes):

The stroke is yet another new concept that will help us to understand deformation and the idea is like traditional drawing/painting. When you create a stroke on a canvas you either go up/down or left/right or in a curvy path and you rarely create a mess by scribbling it. A stroke can be long or short, thick or thin or a combination of what I have mentioned. So far you have worked with the Edgeloop stroke which is the muscle line and by taking this stroke concept further it will help us to texture/deform with ease. This is a rather advanced concept/topic and I won't talk about it here in this thread, maybe in the future when I get into "The Bone".

Quote:

Topology that are supposed to be straight doesn't subsurf well when there are poles in the strokes.

With that stroke concept we can communicate with ease now it seems. A stroke has thickness/thinness and it can be soft or <u>hard</u> and in this case it looks like you're using a very "hard" stroke for the neck! In 2D painting programs you have 2 brushes: hard(paint)/soft(air) and if you want to soften the hard strokes you have to use a blur brush to soften them or go over it with a hard brush many times with different opacity (Blending), in 3d you do that by eliminating the poles and make it flows with the current stroke. I personally don't think you should use a hard stroke for that neck area since "EN Grid" will do the job. What you did were breaking the grid and sometimes it's not necessary when you can tweak and just end it with "EN".

Quote:

Perhaps if the resolution is high enough it won't show bumps when you subsurf it?

Why increase its resolution when you don't have to by simply removing those poles? 🙂

@elGordo:

I use the yellow flow.

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The Pole

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Page 8 of 11 « First < 6 7 **8** 9 10 > Last » ☐

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#**71**
06-24-2006, 05:06 PM

johnfnoo

Join Date: Feb 2006
Posts: 202

Liang, good stuff, thanx for the close up of the ear.
JF

#72
08-04-2006, 06:38 PM

inneractive
Digital
Animation
Student

I just want to say thanks for this thread. There is so much more for me to learn. I'll have to read it a few more times to let it sink in.
_____
-Joe

#73
08-31-2006, 06:42 PM

spyde
Avata

spyder_murphy
|||

THnx for the tut it really enlightened me

#74

10-02-2006, 06:22 PM

fktt
BlenderHead

nice, very nice indeed, now make it into a über video tut series, and well crown you king(if you will be able to make it all work as a video tut that is)

#75

10-15-2006, 11:45 AM

Errantkid

Developer
\ Artist

Directing flows using triangles

Everybody knows that triangles are supposed to be a big no-no in subdivision modeling. And yet, I've always had this queer feeling that somehow, perhaps we're just using them wrong. So, I was busy cleaning up a model today, trying to get rid of triangles, when I noticed something funny. Using Catmull Clark subdivisioning triangles actually produce quads. Not only that, but the centre-most point produced by the subdiv is in fact an N-pole. So it got me thinking: What if we employed triangles as an alternative to direct flows produced via poles?

I first tried a simple circular loop, and then made a second grid to compare the results using extrusion. The last image however produces adjacent flows to continue the grid.
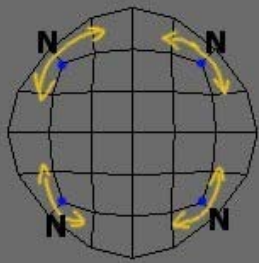
1. Creating flows with triangles   2. Creating flows by "extruding"   3. Creating adjacent flows with triangles
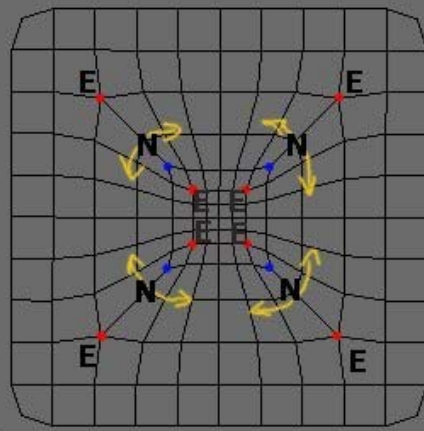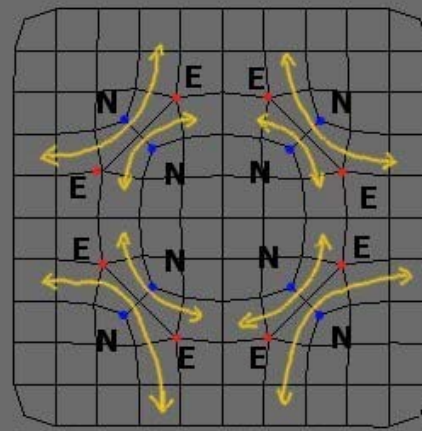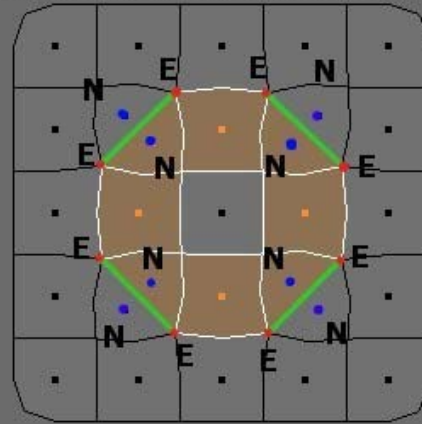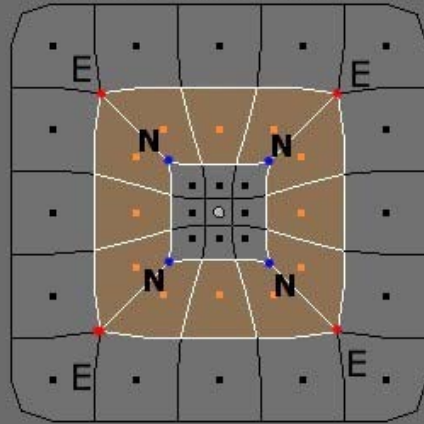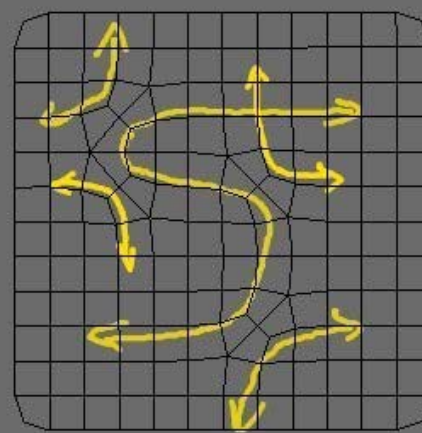
Now, seeing some success using this method I attempted to adjust the grid so that it needn't produce extra flows. Then I attempted a simple S-shaped flow. Results, I think are reasonably favorable:
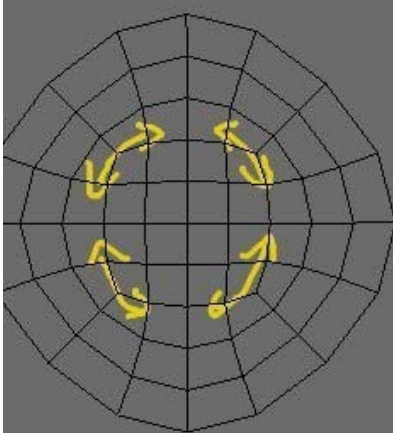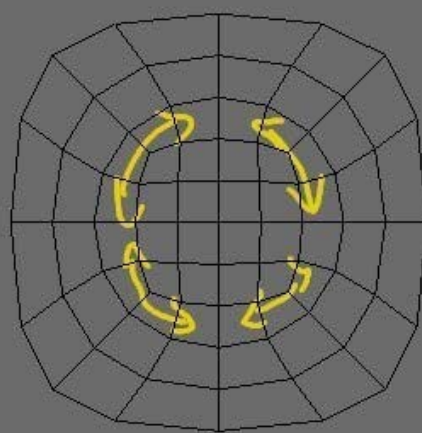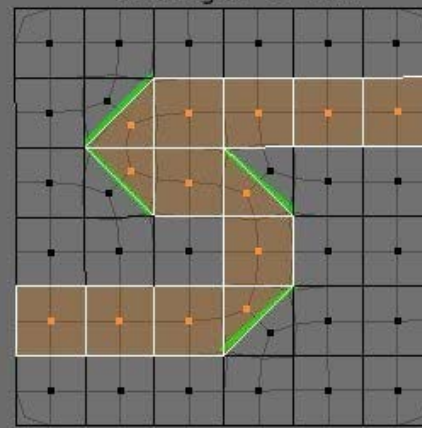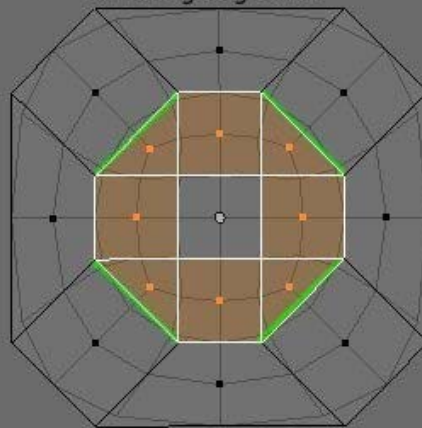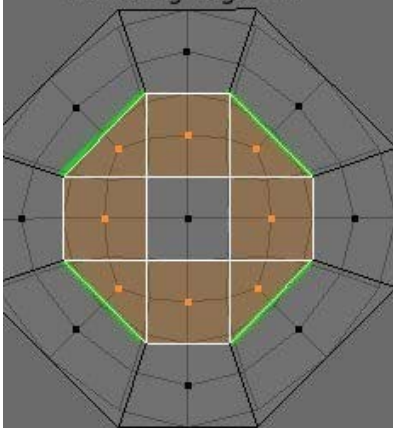

Extruding edges #1   Extruding edges #2   Creating an "S" flow

(EDIT: Fixed the flows in #3 thanks to Toontje 😊)

Now, it's pretty obvious that the N-poles and possible E-poles produced triangles are at least partly responsible for the roughness of such a subdivided mesh. Of course adjacent triangles automatically produce E-poles or even X-poles before even subdividing.

Another little concern is that the quads produced by subdivided triangles are slightly smaller than those produced by quads of roughly the same side-length. So a rather small triangle can become quite noticeable in a subdivided mesh if it stands out in any way.

Now, IMHO triangles could be very usefull for controlling the flow of topology because they are much easier to work with than creating poles by hand. It is much easier to control (or reduce) the density of the mesh by inserting a triangle since a quad-only mesh can result in a lot of loops if you're not careful, especially when detailing.

I haven't gotten round to testing this method with UV-mapping or even in 3 dimensions for that matter. What do you folks think?

(Oh, and thank you for the awesome tutorial btw. 🙂)

Last edited by Errantkid : 10-16-2006 at 11:59 AM.

Quote: Quick:

Errantkid

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#76

10-16-2006, 08:08 AM

Toontje

Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 58

👍

Very clever! I never thought of doing things that way. I think that this is a easier method to build your topology from references. At first glance, it looks like that your mesh will result in a clean topology using this method.

So once more it is evident that there is more than one way to skin a cat.😀

Edit: The problem in your examples is that you split a quad into 2 triangles. In the case of the S loop, it spawned 4 extra loops (not 2 as highlighted above). But when modeling if you have single standing triangles, it will subdivide nicely into a clean topology I guess.

I'll be experimenting using this method......

Last edited by Toontje : 10-16-2006 at 08:33 AM.

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#77

10-16-2006, 11:38 AM

Errantkid

Developer

Join Date: Oct 2006
Location: South Africa, Pretoria
Posts: 8

\ Artist

Thanks Toontje. I only noticed the extra flows after. I should fix it I suppose... Sigh.. Will be back 😉 And looking forward to your results 🙂

#**78**
10-16-2006, 12:53 PM

LoveFest
Custom
Maps
and
Skins

Join Date: Oct 2006
Posts: 2

Quote:

Originally Posted by **SomeArtist**
C-Loop Topology

Since C-Loop was brought up.

modeling the nose is easy with Poly-by-Poly and for a box I still haven't figured out a logical way yet. If you're looking for the best topo for the nose this image is not it. There are better flows for the nose out there and I'll get to Toontje's post later.

This is one of the best 3D threads i've read in last 10 years. Tons of knowledge culminating. Excellent input from everyone. This is answering a lot of questions i've had. Thanks SomeArtist for starting this thread.

Last edited by LoveFest : 10-16-2006 at 12:58 PM.

#**79**
10-16-2006, 02:07 PM

Errantkid
Developer
\ Artist

Join Date: Oct 2006
Location: South Africa, Pretoria
Posts: 8

●

A real-world example

In order to demonstrate the concept of directing flows with triangles a little better I decided to post a more real world example. This is the ear of a gnome character I've been working on. Follow the outer rim of the ear to see the flow. I redirect it twice using triangles to form a small little spiral. This would have been a bit more difficult using only poles. In a really complicated area like the ear, poles seem to actually help add the detail we need in this area. The trick is just to understand the direction of your strokes.
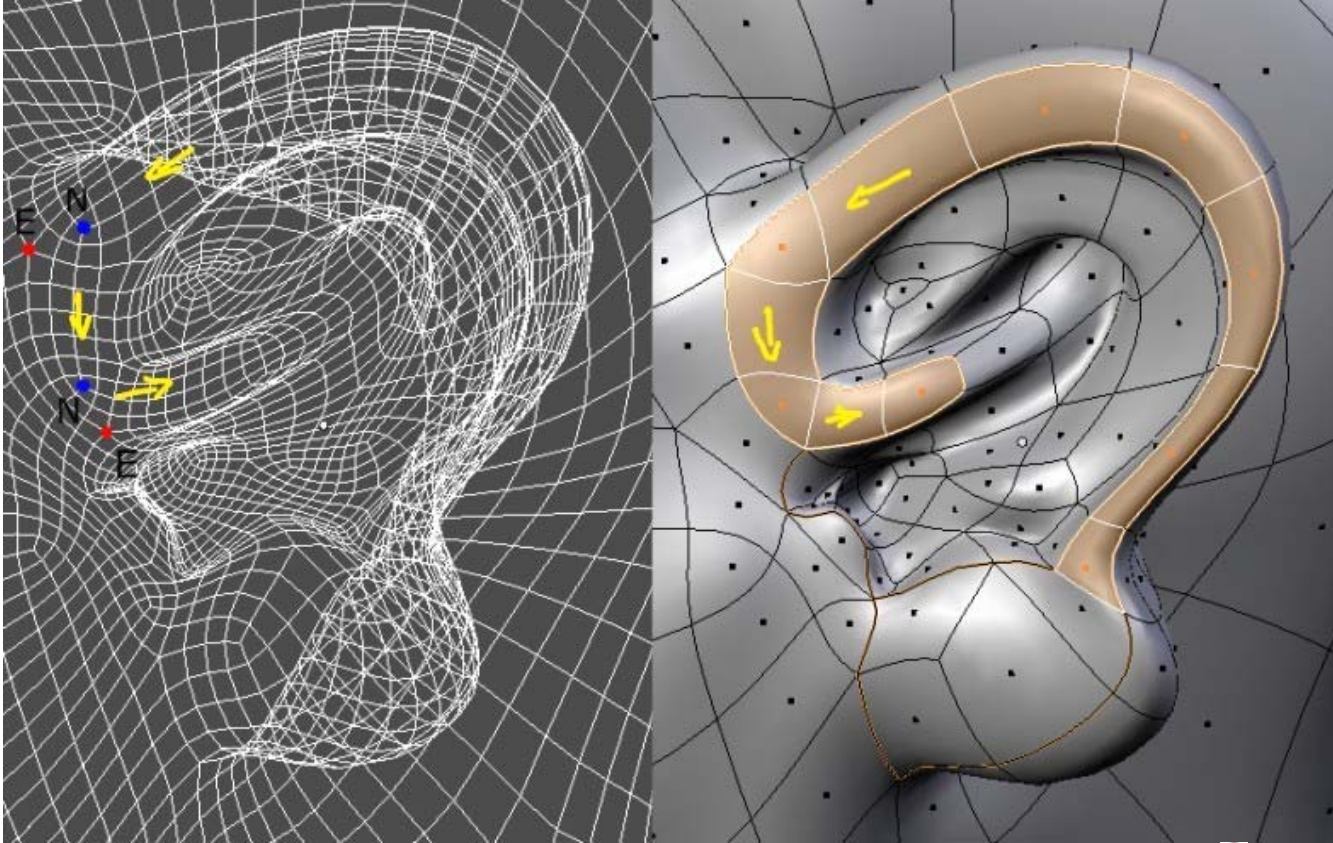
Warning: Don't look too closely at the rest of the topology. I originally did this model before I read this tutorial 😜

I skipped a lot of E- and N-poles in this image. See if you can spot them. Notice that the red E-poles create ugly looking sharp corners. These can be avoided by reducing the edges at those points (i.e. creating less adjacent quads). So this seems to indicate that you can use triangles to reduce density in an area by removing the N-poles around them. Conversely we could use quads to increase density? This seems to be a good area for further study 😊

EDIT: I did some more research on this and found that I could prove the reduction in density. I'll continue this discussion tommorow!

Last edited by Errantkid : 10-17-2006 at 12:53 PM.

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☐ 10-17-2006, 12:33 PM

Errantkid
●
Developer

Join Date: Oct 2006
Location: South Africa, Pretoria
Posts: 8

Controlling Mesh Density

Following on my before mentioned idea of reducing mesh density I decided to test how many adjacent quads would form an "ideal" N-pole for a traditional quad N-pole and a triangle N-pole. By ideal, I mean that only a single E-pole should be present an no surrounding E-poles, or N-poles. In other words all other poles should be Q-poles.

I started out by taking a triangle N-pole and extruding a more-or-less uniform quad grid from it so that each vertex would have only 4 edges. Then I did the same with an N-pole formed out of quads. Then for each extruded level I counted the number of quads. This was the result:

1. Optimal triangle N-Pole   2. Optimal quad N-pole
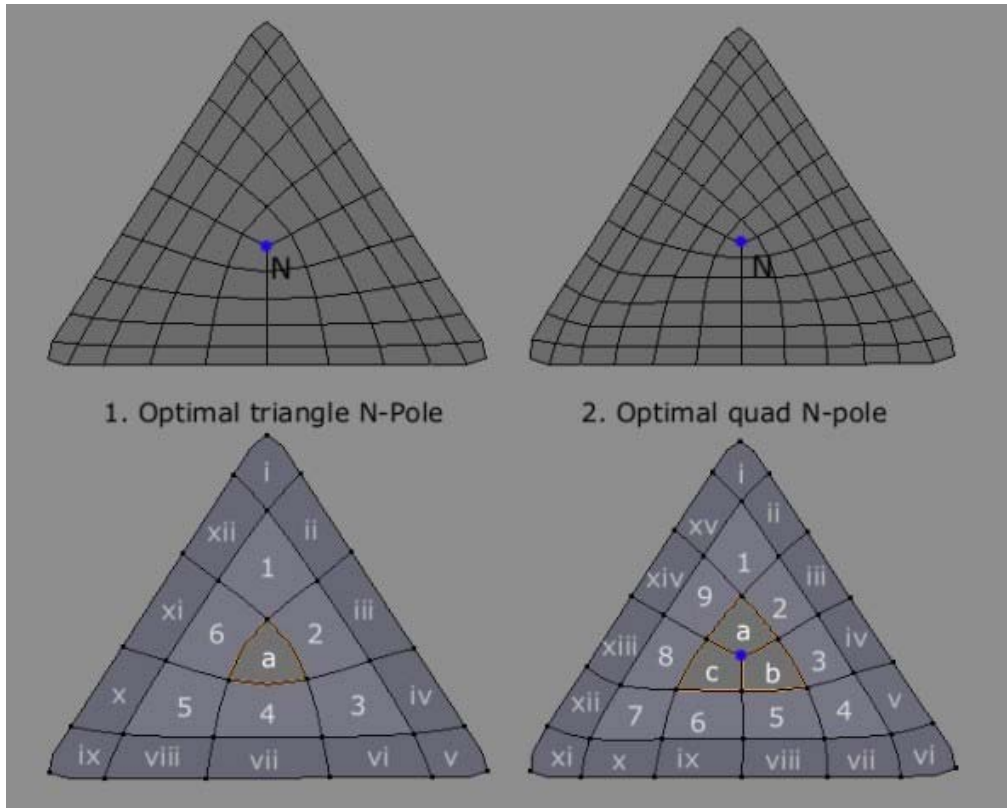
Number of faces:
Level 1: Triangle N-pole = 1, Quad N-pole = 3
Level 2: Triangle N-pole = 6, Quad N-pole = 9
Level 3: Triangle N-pole = 12, Quad N-pole = 15

Notice that the triangle N-pole produces an even number of quads, whereas the Quad N-pole produces an odd number of quads at each level. To better understand the number of quads generated we do a little math (I'm very sorry 😖). We start from level 2 since level 1 is a special case. Let n be the number of faces in the previous level.

Triangle faces per level: Faces = #sides - #corners + 3 x #corners = n - 3 + 9 = n + 6
E-pole faces per level: Faces = #sides - #corners + 3 x #corners = n - 3 + 9 = n + 6

So for both techniques the number of quads increases constantly by 6 per level. Only the initial numbers differ.

Now, looking a little closer at the edges you'll notice that the two figures are almost identical in their topology, *except*, with the quad N-pole, each edge has a line running through its center!

1. Optimal triangle N-Pole   2. Optimal quad N-pole

Center lines

No center lines
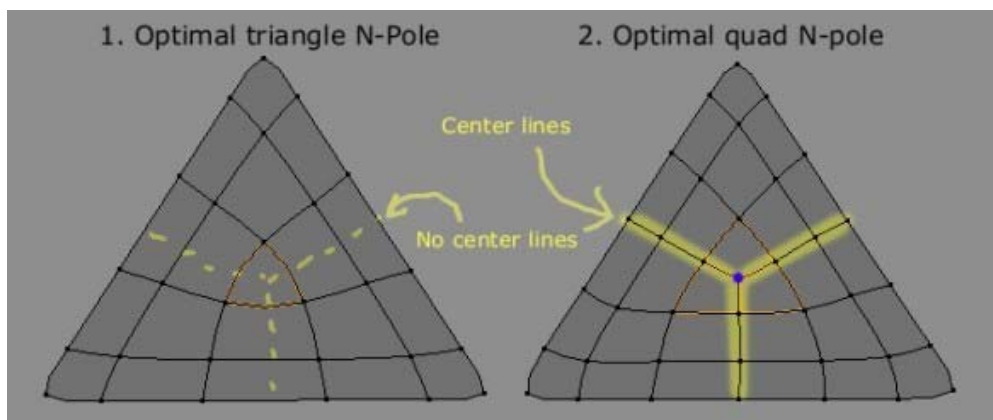
I've changed my mind about saying that a triangle reduces the density of a mesh. After all the density depends wholy on the size of its faces and the quads that form an N-pole can simply be scaled larger. I suspect that using a triangle in a certain position rather than an N-pole may just as easily increase the density as decrease it. Rather, it depends on the situation in which you use it. If the technique that you're using doesn't provide you with the correct number of edges, then simply exchange it for the other. In this way we can *control* the density of the area. We can say that the number of edges generated by a triangle has a different *multiplicity* to the edges generated by a regular N-pole. (WARNING: I borrowed this term from mathematics and I'm still considering whether it is correctly used here.)

Of course it is still worth noting that triangles have more apparent visual cues that you can more easily follow with your eye. To see a flow, simply follow the edges of the triangle. However, N-poles formed of quads may occur more naturally with the certain common tools and workflows - especially box modelling. Triangle N-poles will occur most naturally with Poly-by-Poly modelling where you define the topology as you go along rather than incrementally.

Well - thanks folks. I hope you found that useful. I'm not quite done yet! There's still one topic (possibly of two parts) that I want to investigate and it has to do with the angles between edges and what influence (if any) it has on flows. Unfortunately I have a really big exam coming up so it might take me a while to get there. 😊

Last edited by Errantkid : 10-17-2006 at 02:24 PM.

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The Pole - Page 9 - Subdivision Modeling

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a sub-division modelers primer

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#**81**   ⓘ
◻ 10-17-2006, 12:46 PM

[Adam] ◯
Super
Moderator

Join Date: Jan 2006
Location: Going up Camborne Hill, coming down!
Posts: 710
◯ ◯ ◯

◯

It's great to see this thread really active again. There's so much to take in here. I keep coming back to it.

Thanks Errantkid, for your triangular thoughts. If you put as much thought into your exams, I'm sure you will get top marks! Good luck. 🙂

Adam

Quote: Quick:

Adam

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#**82**   ⓘ
◻ 10-17-2006, 12:51 PM

[Errantkid]
◯
Developer
\ Artist

Join Date: Oct 2006
Location: South Africa, Pretoria
Posts: 8

◯

Thanks Adam! Lol. I made a really huge mistake in my two previous posts (swapping E-poles & N-poles). Don't worry I'm busy fixing it as I speak people 😊.

Quote: Quick:

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#**83**   ⓘ

Joe

The fundamental difference between using triangles/ngons and using all-quads is that you have slightly more control over where the poles go when you model with all-quads. As has been observed, if you subdivide once with Catmull-Clark subdivision, any topology becomes all-quads with poles. And once you have an all-quad model, any further subdivision will have exactly the same number of poles, in the same places. So all-quad modelling lets you place the poles, while triangle/ngons automatically place the poles in the next subdivision level. Thus, all-quad modelling lets you adjust the funny-looking shading associated with poles by tweaking the position of pole vertices, while you have no such option with a triangle/ngon. The only benefit of triangle/ngons is that they can make the edge loops more obvious, which looks a little nicer in wireframe and can make them easier to select in your modelling software.

Not that it matters much, because poles will always shade a little funny unless they are on a flat surface, whether they exist in an all-quad or triangle/ngon model. The best practice is, as always, to minimize the number of poles, placing them in flat, unimportant areas away from any moving parts.

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Joe

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#**84**

LoveFest
Custom
Maps
and
Skins

Excellent Summary: Great reason for sticking with Quads and avoiding dark spots in your models for animations.

Quote:

Originally Posted by **Joe**
And once you have an all-quad model, any further subdivision will have exactly the same number of poles, in the same places.

The best practice is, as always, to minimize the number of poles, placing them in flat, unimportant areas away from any moving parts.

Quote: **Quick:**

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Toontje: Hope my comments helped a little. I'm curious to see what you turn out! 😀 It's a good idea - it'll be helpful to see how well triangles actually hold up in real situations and how they compare with other techniques.

Ciao! Hopefully I'll have a little bit of time again for experimentation in a week or two. 😊

Last edited by Errantkid : 10-19-2006 at 12:38 PM.

Quote: Quick:

Errantkid

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#**87**

10-20-2006, 06:11 PM

Toontje

Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 58

@ Errantkid: I tried and I tried, but working with triangles in your base mesh is just impossible to work with. Let me explain why.
(I will argue from the point of view that one is using box modeling).
a) It is difficult to impossible to place one single triangle without rearranging you world grid to accommodate a solitaire triangle. Them triangles comes in pairs, thus generating unwanted loops.
b) Even if you succeed to place triangles, your topology is disproportionately riddled with E-poles.
c) This method could be used for poly by poly (vert by vert) modeling, but one has to be careful not to introduce N-poles through this process.

My conclusion is that in fighting to place triangles, it takes more time then model it directly.

But your explanations about triangles are surely necessary stuff to know because when modeling, you'll be dealing with triangles in the long run anyway.

Maybe we should investigate this from another angle. So far you've explained how to control flow by reducing triangles. But what I found most fascinating is that in SomeArtist's time lapse videos, he control flow by placing more triangles. For example he identifies a problem area and cut it. Then he match the triangle(s) that resulted from the first cut with triangles from subsequent cuts, join them together again to make them quads. His method is fascinating because he doesn't produce awkward 'diamonds'. Pity though he doesn't really explain/ breakdown his method.

Quote: Quick:

Toontje

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#**88**

10-20-2006, 06:34 PM

Toontje

Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 58

● Flipping the N-pole: correcting S-cuts part 2

I've explained a while back (http://www.subdivisionmodeling.com/f...p?t=907&page=4) how to correct cuts because they spawn a lot of 'trash' loops that can easily go undetected. Figuring out Errantkid's thesis I stumbled upon a much easier way to correct S-cuts and on the same time this method could be useful for other situations also.
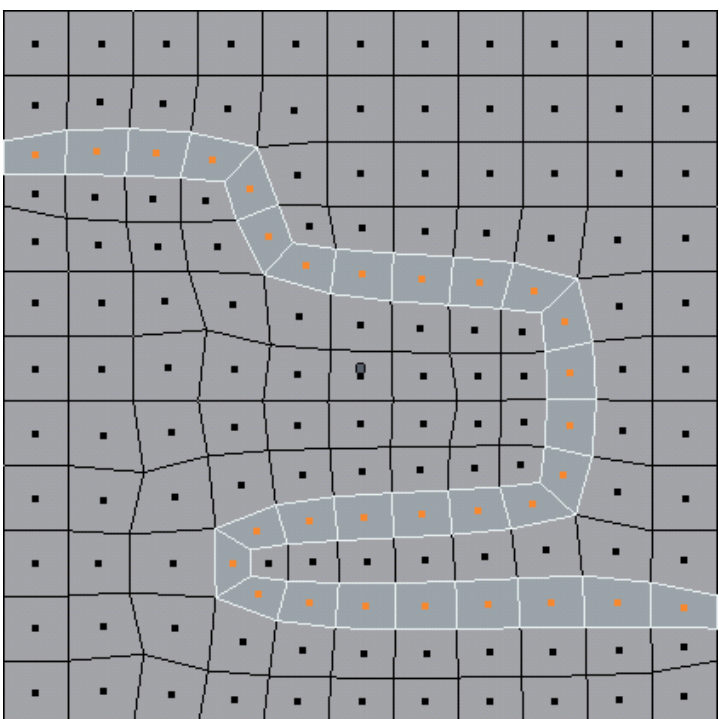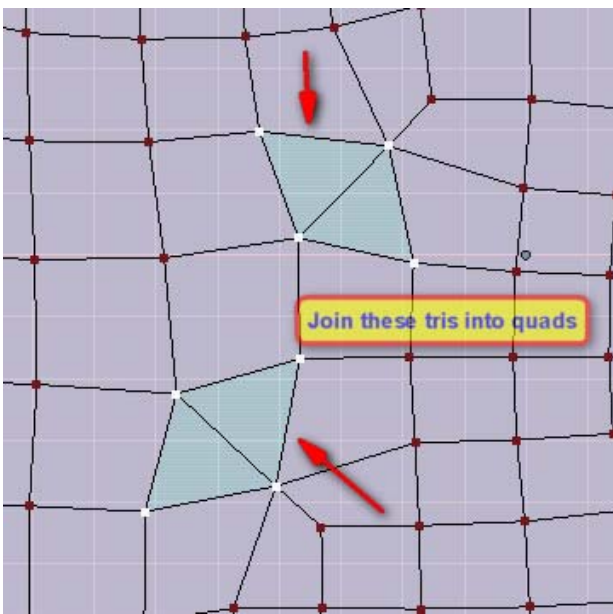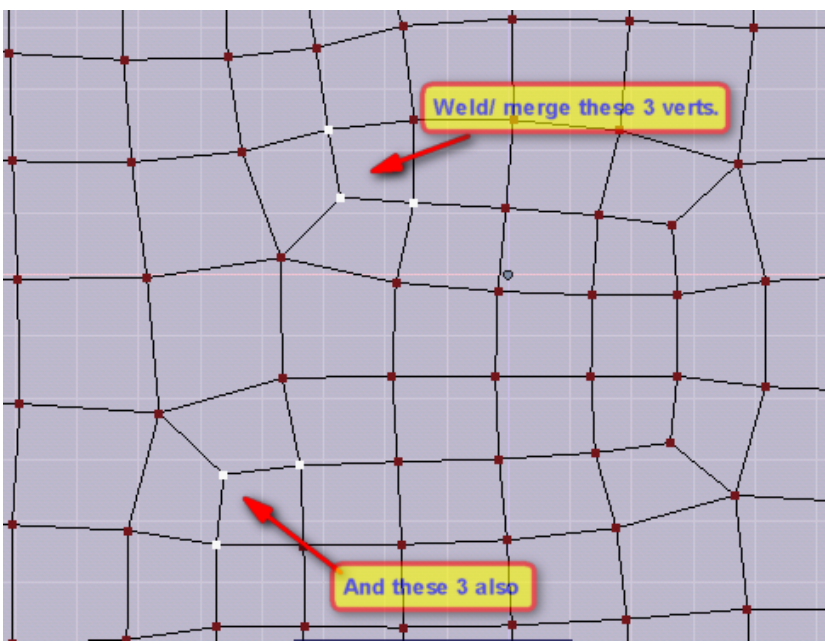
So, let's recall the problem in the case of S-loops:
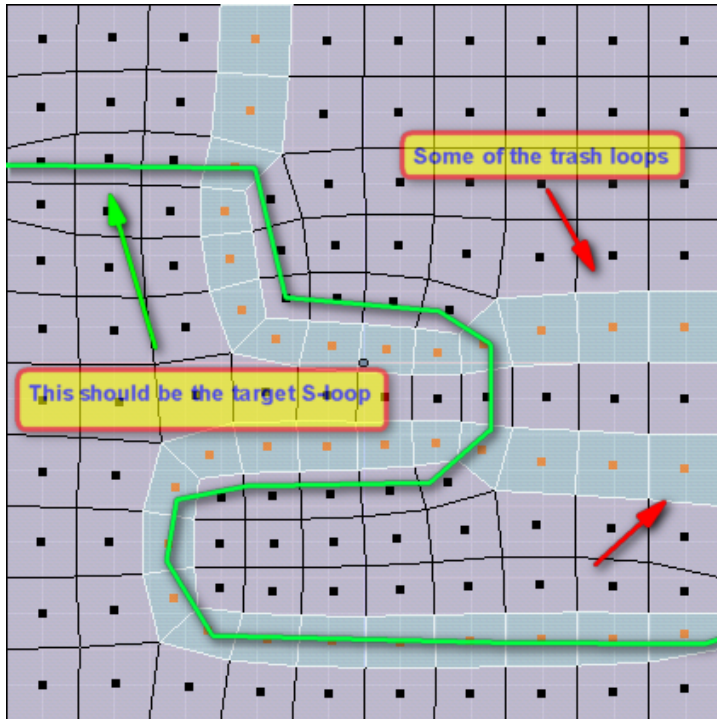
There are 'trash' loops all over. Loops bend at a N-pole. And in this illustrated situation below, the N-pole is on wrong side of the track.
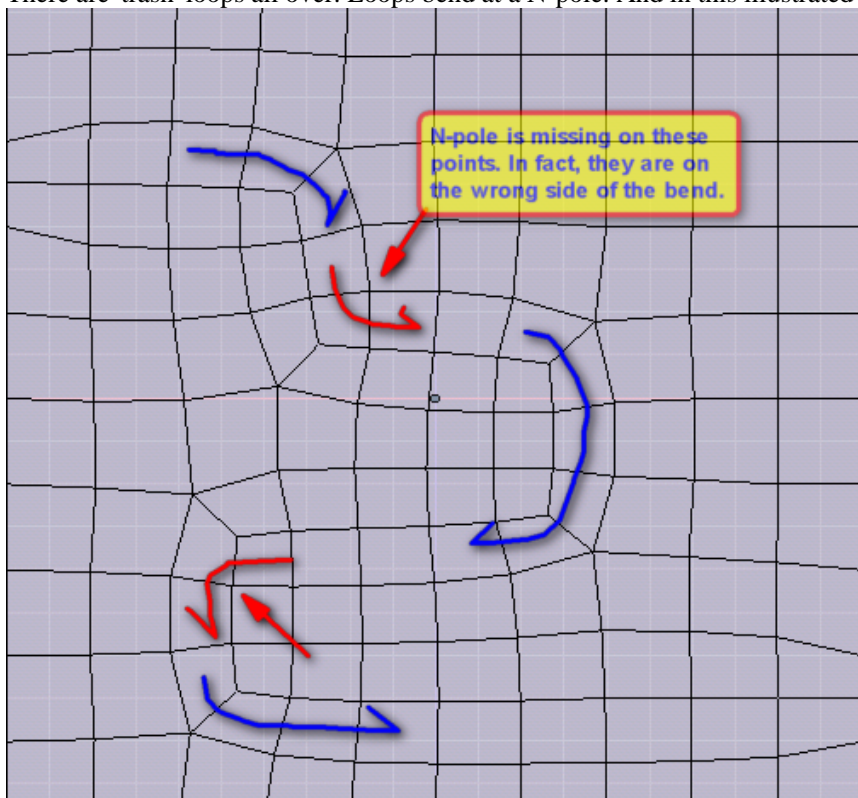
The method to flip it is to merge (weld) this 3 vertices's. Then you are left with 2 triangles that can be merged into a quad, and voila!

This method can be used to move poles around I guess.

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Toontje

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#**89**

10-20-2006, 06:36 PM

Errantkid

Developer \ Artist

Join Date: Oct 2006
Location: South Africa, Pretoria
Posts: 8

Thanks Toontje. I was just about to reply to the prev post 😊 Yeah I've also been struggling with the concept, and I think perhaps you're right. One or two things started to bother. For one I can't seem to get rid of E-poles either and another is that's it's impossible to direct the edges from a regular N-pole onto a triangle. Still, the concepts of poles have become much clearer to me, and I've already learnt an immense amount. I'm convince we may still discover more if we take some time to analyze and perhaps develop a set patterns. I have to admit I haven taken the time yet to watch SomeArtist's videos. It sounds fascinating - It sounds like a good area to perhaps document some concrete techniques.

As an aside: I would love to get all of this technique down on a wiki. This thread is already 9 pages! Also, imagine if we could develop a library of common keys for organic models. Faces, muscles, etc. Anyone willing to install mediawiki? Mods?

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Errantkid

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#**90**

10-20-2006, 07:45 PM

Toontje

Bachelor/ Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 58

There are enough techniques explained here to really model like a pro. But I think there still lots of areas left unexplored. I think by now, modeling a head must be just one of the simplest things by now. Maybe modeling some of them Star Trek humanoids is a nice challenge. In any case there should be enough mastery of loops 'n poles.

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The Pole - Page 10 - Subdivision Modeling

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a sub-division modelers primer

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#**91** ⓘ

🔲 10-21-2006, 07:41 AM

Join Date: Jan 2006
Location: Minnesota, USA
Posts: 18

Joe

|||

🟠

Quote:

Originally Posted by **Errantkid**
As an aside: I would love to get all of this technique down on a wiki. This thread is already 9 pages! Also, imagine if we could develop a library of common keys for organic models. Faces, muscles, etc. Anyone willing to install mediawiki? Mods?

You could try starting a book on wikibooks, or adding to one of the existing books.

Edit: If you do, I recommend calling E-poles "5-poles" and N-poles "3-poles", which better describes what they are. SomeArtist seems to have given them letters for the purpose of inventing terminology. I mean... "Nose pole"? Really.

Last edited by Joe : 10-21-2006 at 08:51 AM.

Quote: **Quick:**

Joe

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#**92** ⓘ

🔲 10-24-2006, 08:09 PM

Toontje

Join Date: Jan 2006
Location: Bonaire N.A.

◉ Moving poles around

@Joe: It makes sense to call those 3-poles and 5-poles indeed. But on the other hand I think we've come so far in this discussion to ask for a change of convention. And it is also debatable if a number assigment is more (or less) descriptive than a letter assigment.

I've explained several post back how to move poles through the rip/ break command. A much easier method is to merge a vertex that is shared by the N pole and the E pole and a vertex from an adjacent edge of the E pole. The following diagrams explains the procedure.
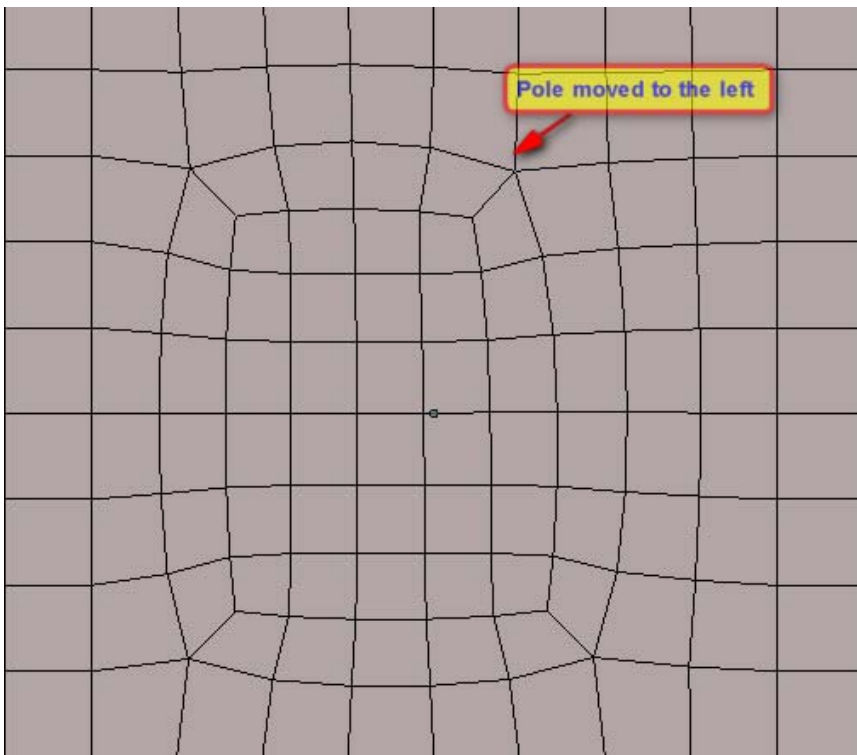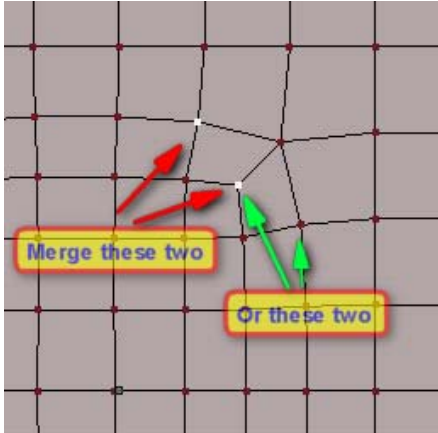
In the example above the poles shifted to the right. To shift the pole down, merge the other verts.

Notice also that is very handy to move loops that are created with the spin edge command. Just experiment.
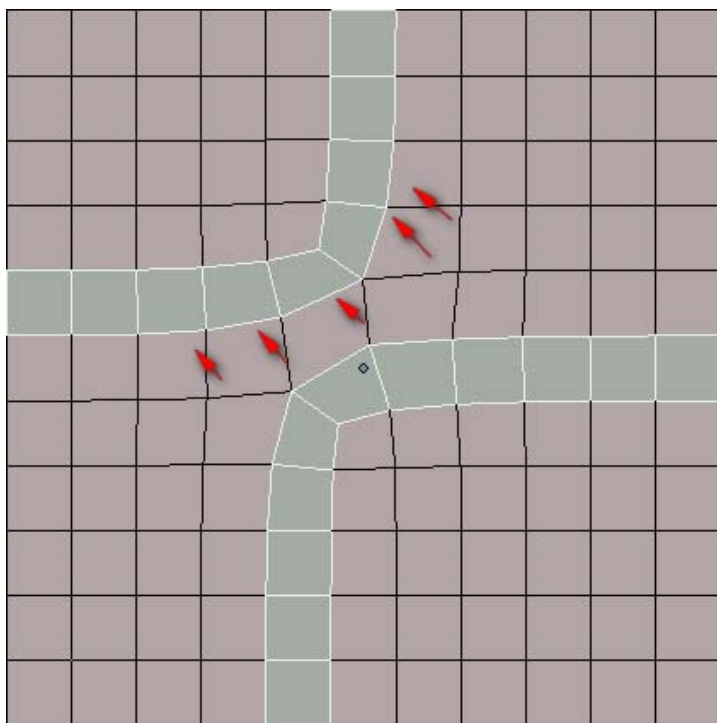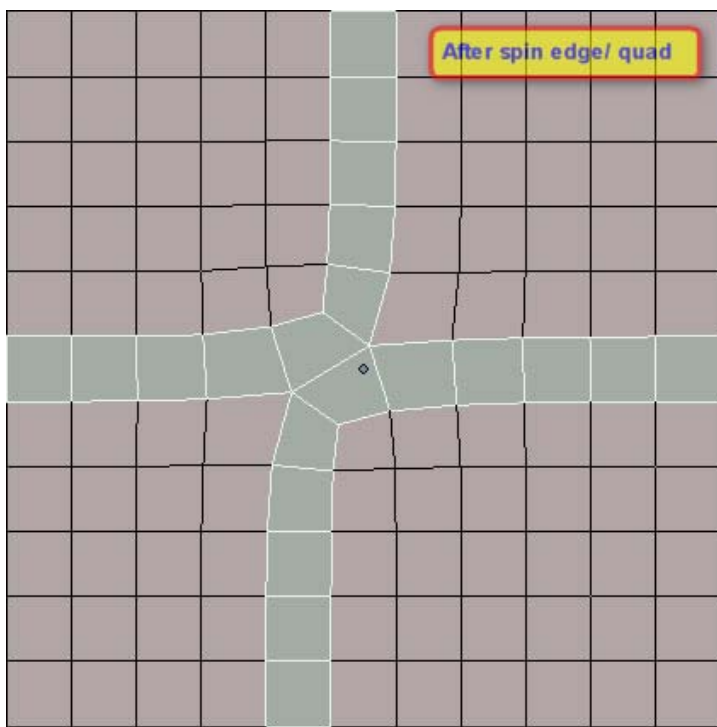
One word of caution though: it works only with key loops. If there are fill loops in between, then you'll be creating a new loop. In fact, almost all techniques here explained in this thread works on a level without fill loops only.

This method makes it easy to achieve that spiral loop that SomeArtist was talking about.

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#93

10-24-2006, 08:37 PM

Breaking the grid (again)

Breaking the grid (again)

I was thinking about one of the greatest difficulty of organic modeling. It seems that the professionals are able to model complex forms like muscles with ease. But a mesh is kind of orthogonal, so how are they able to pull it of?

After careful study of some wire frames, I know realize what SomeArtist meant with painting with poles. I noticed that in the wire frames, diagonals are connected/ formed through E-poles. It seems logical too come to think of it. One edge is used to 'draw' diagonally, while the other 4 edges maintains the orthogonal characteristic of the mesh. But working with poles means introducing loops that could be disastrous for the model. After all, the loops are there primary for animation, i.e. mimicking the muscles.

I've come across this model and the topology is very clean, the neck muscle is nicely modeled without bunching up the verts in it's vicinity.
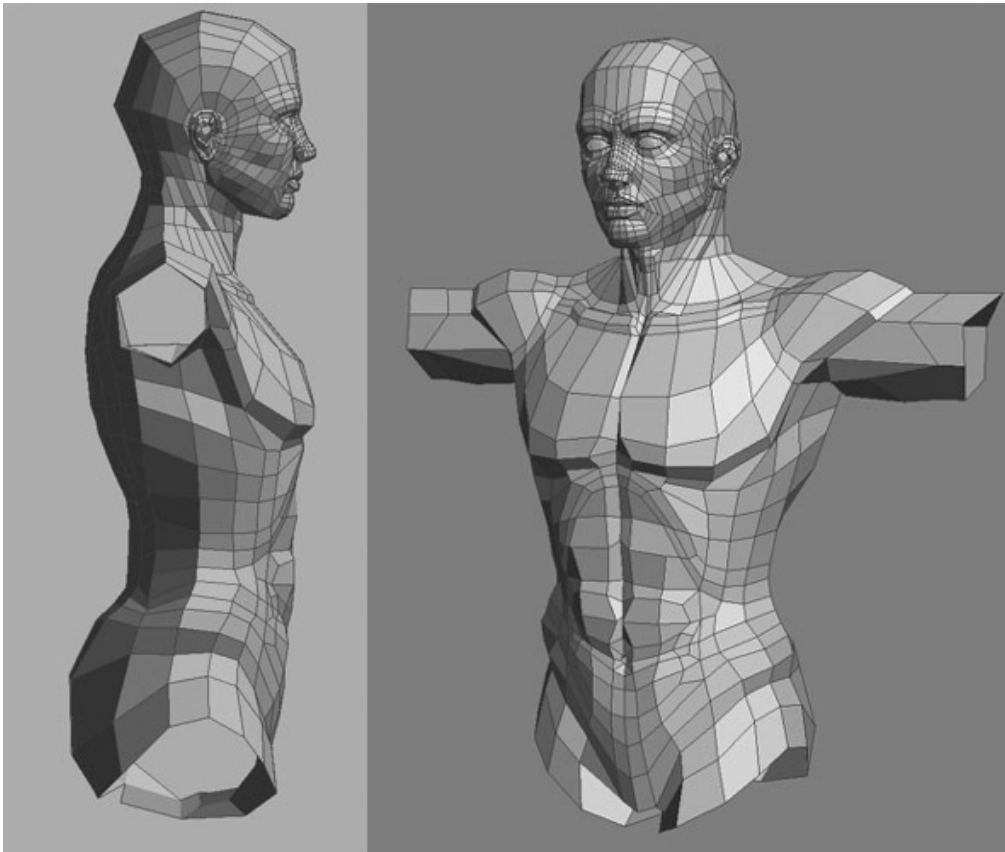

As you can see, this diagonal structure is made possible by using E-poles. And if you watch carefuly, there aren't no 'trash loop' either.
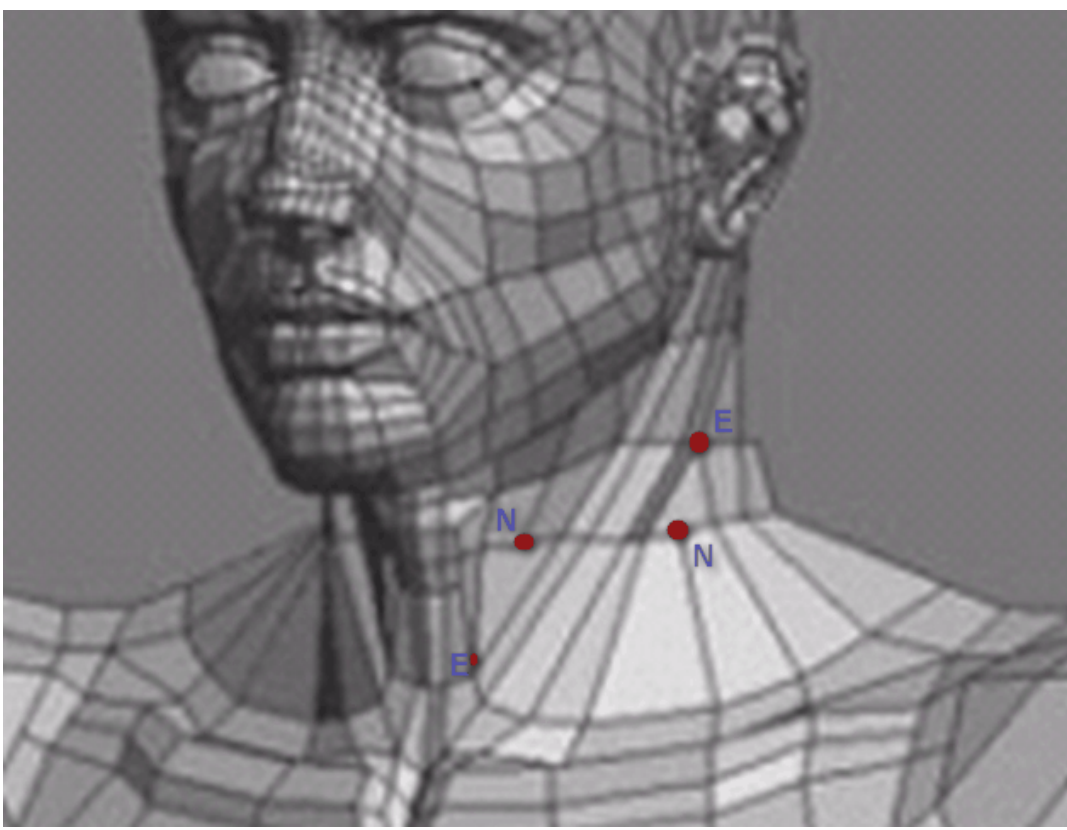
I call the loops that are made by this manner of modeling "T-loops". The T-loops that is formed by the arrow-like N-E pair has branches that flows horizontally across the throat. I think that this is the least intrusive loop and the way to model it is like this:

Cut just along a edge like this (C- cut)
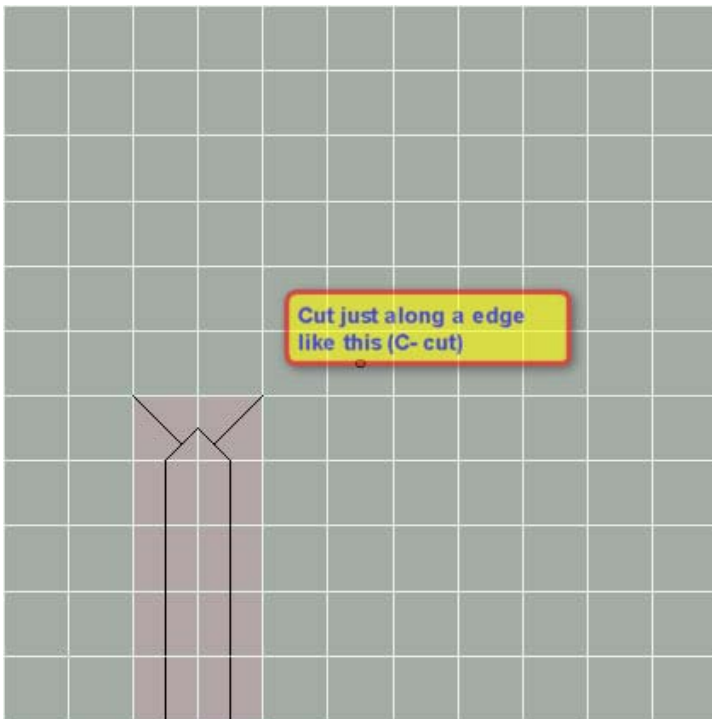
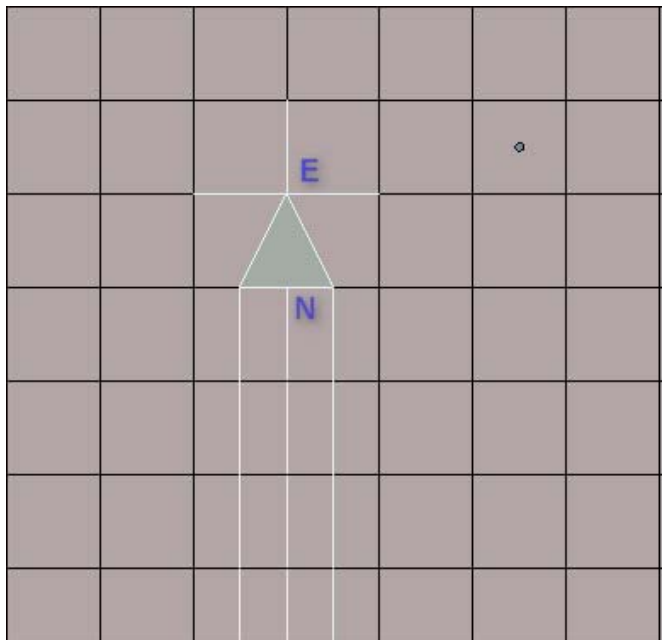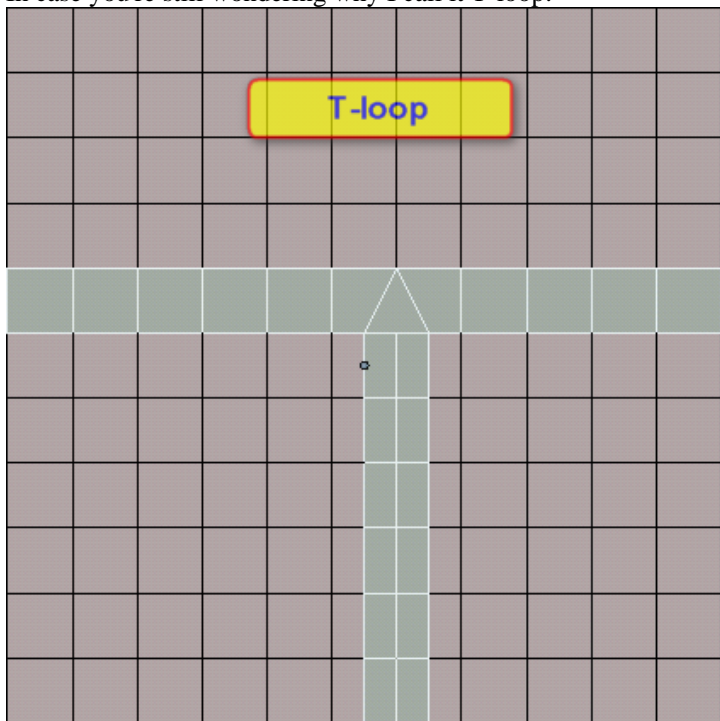Cut just along a edge like this (C- cut)
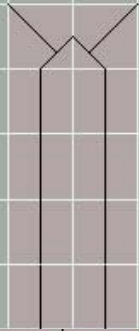
Merge these

Join these tris

I'll be experimenting with more with this theory. I think that this is on of the keys to mastering organic modeling.

In case you're still wondering why I call it T-loop:

I think it would be great to have this as a wiki book. Maybe if this thread is mature enough, who knows.... it could be released as THE guide to organic modeling 😊

Last edited by Toontje : 10-25-2006 at 06:38 PM.

Toontje

Bachelor/
Ingenieur

Join Date: Jan 2006
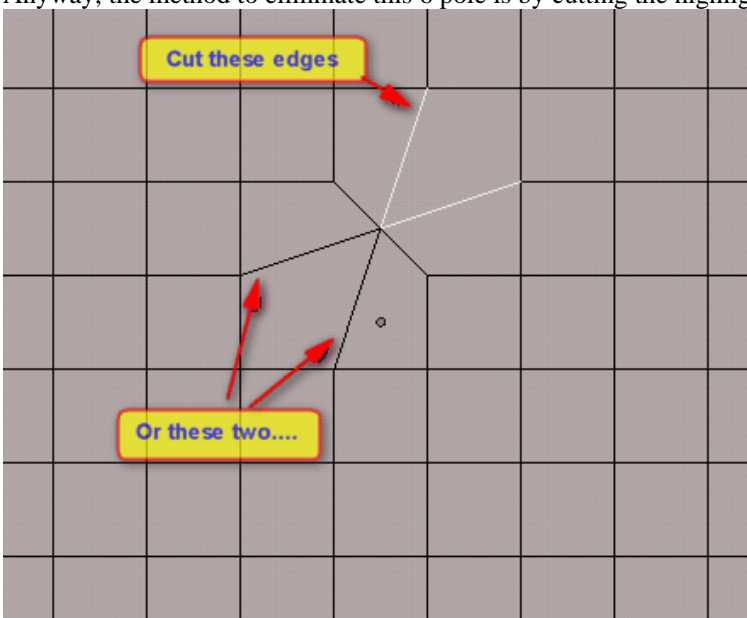Location: Bonaire N.A.
Posts: 58

Fixing 6 poles

Sometimes it is required to reduce a 6 pole in order to fix the topology. Besides, I heard often that it causes ugly creases/ pinching when animating (as do E poles allegedly).
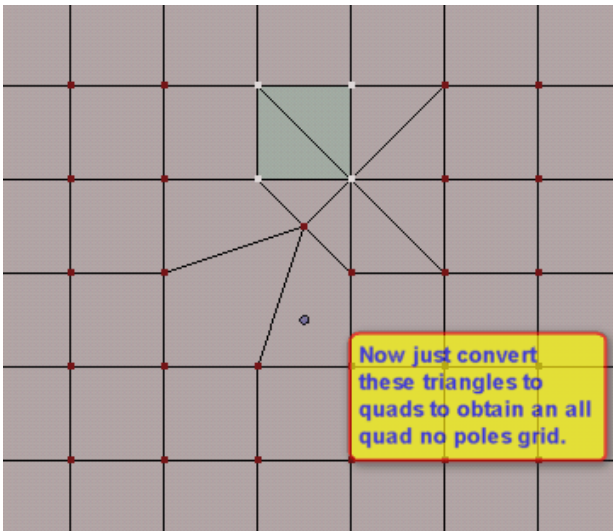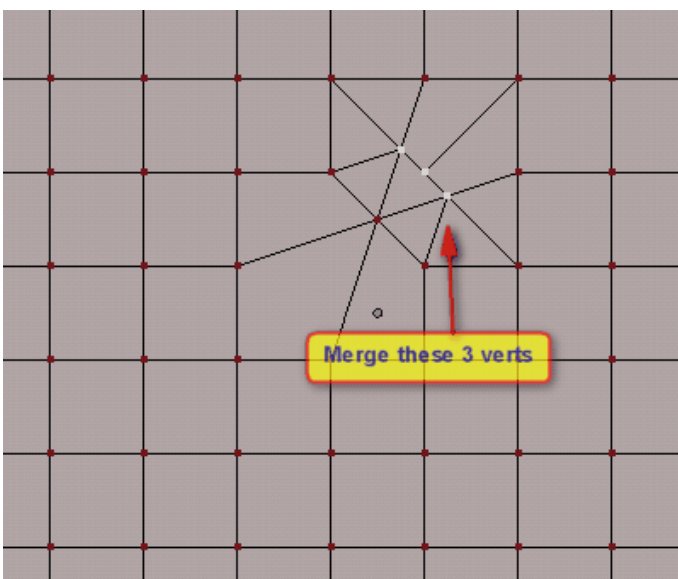
I don't think that the following method is applicable in all situation, but it's about the mindset.

In the example below, a 6 pole is created by merging 2 opposing vert in a quad. With this action it also created 2 loops just like in a spin edge, but a little different.
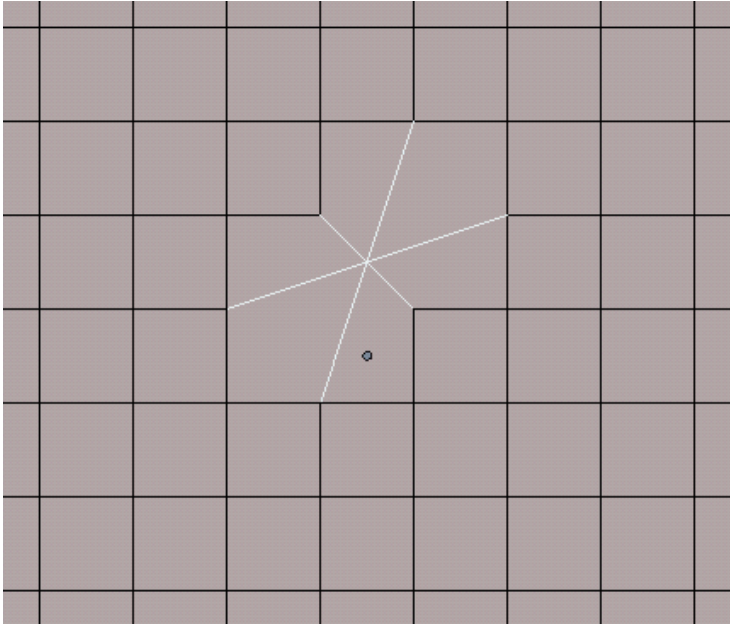
Anyway, the method to eliminate this 6 pole is by cutting the highlighted edges to begin with (stay away from the N pole).

Cut these edges

Or these two....

Merge these 3 verts

Now just convert these triangles to quads to obtain an all quad no poles grid.

Last edited by Toontje : 10-25-2006 at 06:41 PM.

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#**95**
10-25-2006, 02:23 AM

SSwayne

Tryin To
UnPoop
My
Loops

Join Date: Oct 2006
Location: Washington, USA
Posts: 2

Hello All...

First post here... been saving myself 🙂

First off, many thanks to SubdivisionModeling.com, SomeArtist, and last but not least, Toontje, for this thread...

As a modeling noob, I have read through this thread over and over, and still, I've been struggling to grasp the mechanics of flow redirection/pole relocation.

@Toontje:
you must've been feeling my pain tonight 🙂 ... the timing of your previous post (about the easier method for moving a pole) couldn't have been more perfect... Thanks also for your continuing updates to this thread, they are greatly appreciated...

Oh yeah, BTW, SomeArtist, where the heck are you hiding? 🙂

SSwayne

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#96

10-25-2006, 02:03 PM

Errantkid

Developer
\ Artist

Join Date: Oct 2006
Location: South Africa, Pretoria
Posts: 8

@Joe: I love the idea of a wikibook! That would open it to a wider audience too. The only thing that bothers me is that it wouldn't automatically be linked to an active community. Just look at how successful the blender wiki is (and the blender wikibook too). If we could link it to subdivisionmodeling.com, that would be awesome. I figure that if we can have a website dedicated to subdivision modeling, then why not a wikibook? Back to studies 😣

Errantkid

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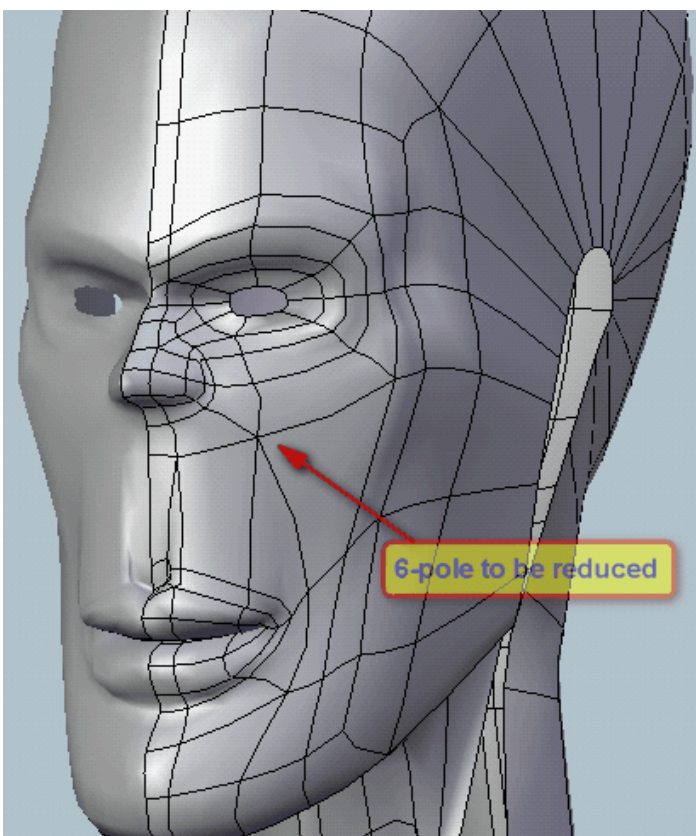Add Errantkid to Your Buddy List

#97

10-25-2006, 09:53 PM

Toontje

Bachelor/
Ingenieer
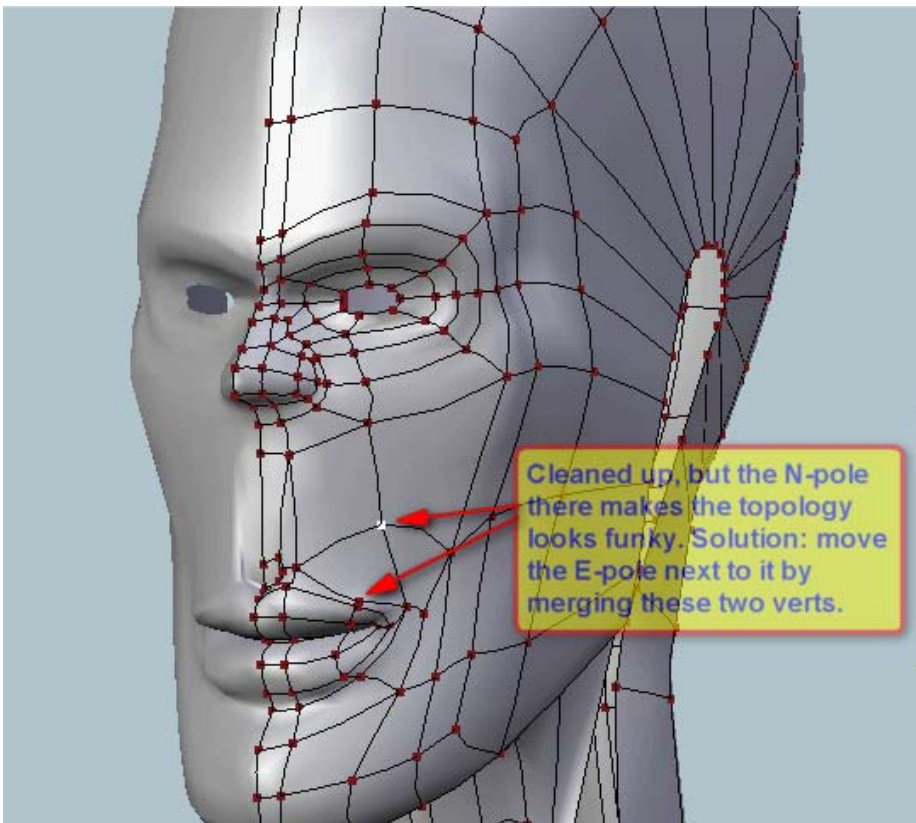
Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 58

🟠 A practical example

@SSWayne: Thanks bro. It makes me glad that I'm of some help. I myself think that my way of explaining things is too schematic to be of any help in a real situation.

I deliberately modeled a 6 pole in:

6-pole to be reduced

Here it does matter where you decide to reduce the 6-pole. I choose to cut trough the lower edges of the 6-pole because it gives a 'cleaner' result there.

Cleaned up, but the N-pole there makes the topology looks funky. Solution: move the E-pole next to it by merging these two verts.

But after reducing the 6-pole , the topology looks kind of messy above the lip. I decided to move the E-pole (simple vertex merge explained a few post earlier), and already it looks much better:
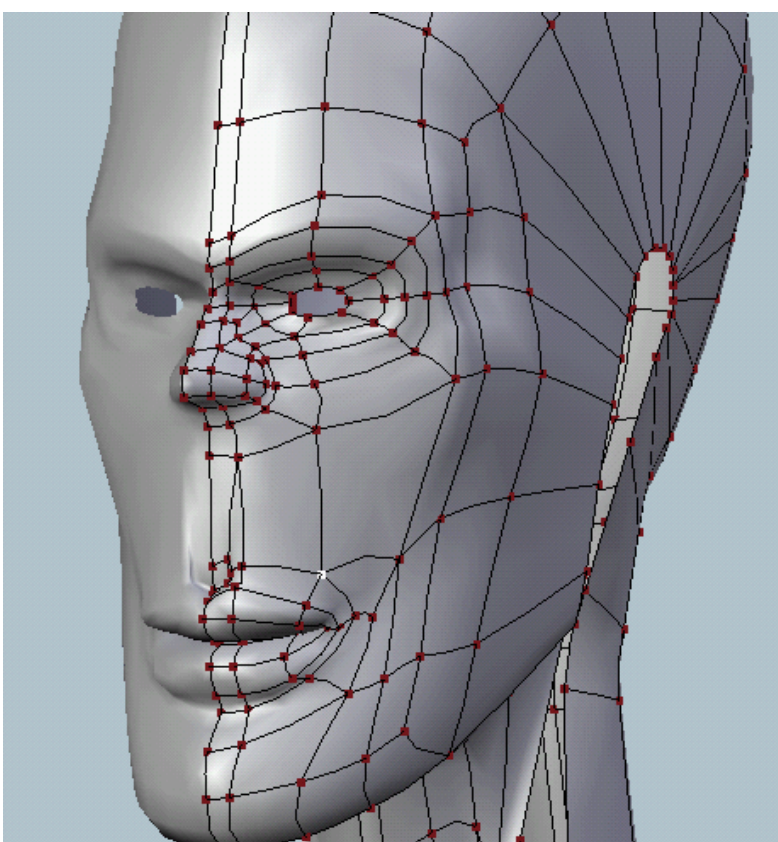
Of course it is far from done, the topology could further be fixed. But the main idea is that the topology can be easily controlled (drastically) by using some simple techniques.

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#98

10-26-2006, 07:39 PM

grafix
III

Join Date: Mar 2006
Posts: 1

🔶 **Rotate edge?**

The task could also be accomplished faster by simply selecting the diagonal edge and rotating it.
Great thread and I'm learning a lot from it.
Thanks.

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#99

Toontje

Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 58

Yes it could, but be aware that when you use spin edge, new unwanted loops could be produced. It really depends on the situation and your goal,

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#**100**

10-27-2006, 04:42 PM

Toontje

Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 58

Recap: difference between that Noobish look and the profesional look.

Is it truly possible to keep discussing this topic endlessly? Anyways...

In lots of forums you see noobs trying to model a head with awful results (although the effort is certainly to be commended). However hard they move the vertices's to make the head as good as possible, they all suffer from the collapsed cheek syndrome and Woody the Cowboy nose. It is because the topology they made is restricting them to do so.

It was already argued that for a topology to look profesional, you have to use as much possible:
a) C- loops (open loops)
b) Spiral loops (debatable I think... what do you guys think?)
c) T-loops

To be avoided as much as possible: Extrude loops. Those loops that have 4 E poles on the same line/ edge loop.

Extrude loops looks so isolated on a mesh. They're like islands. I wouldn't mind using them for the mouth and eyes topology, although a spiral looks extra sexy when used for the eyes topology. Maybe when extruding limbs, it could be a good thing to break the sterile extrude loop.
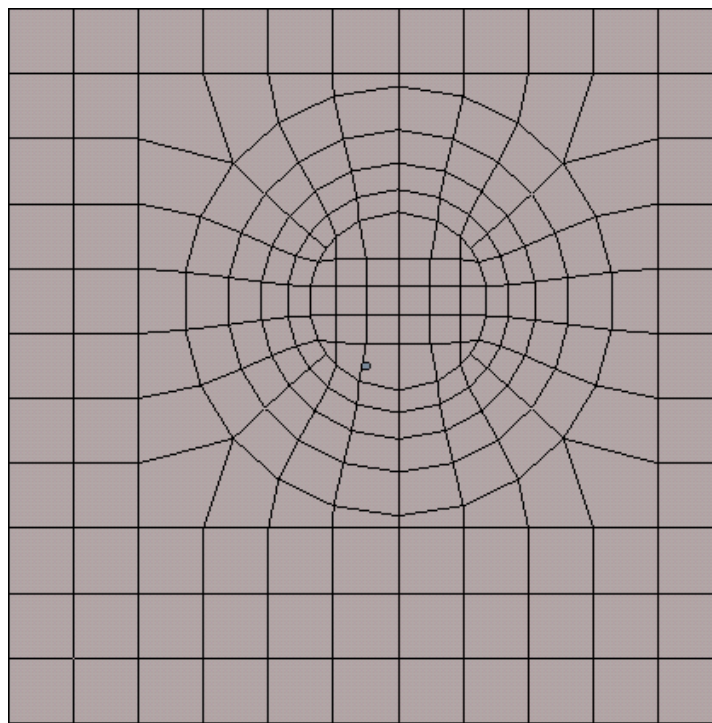
Nice, but it doesn't look organic.. rather more mechanic

This is becoming to look better:
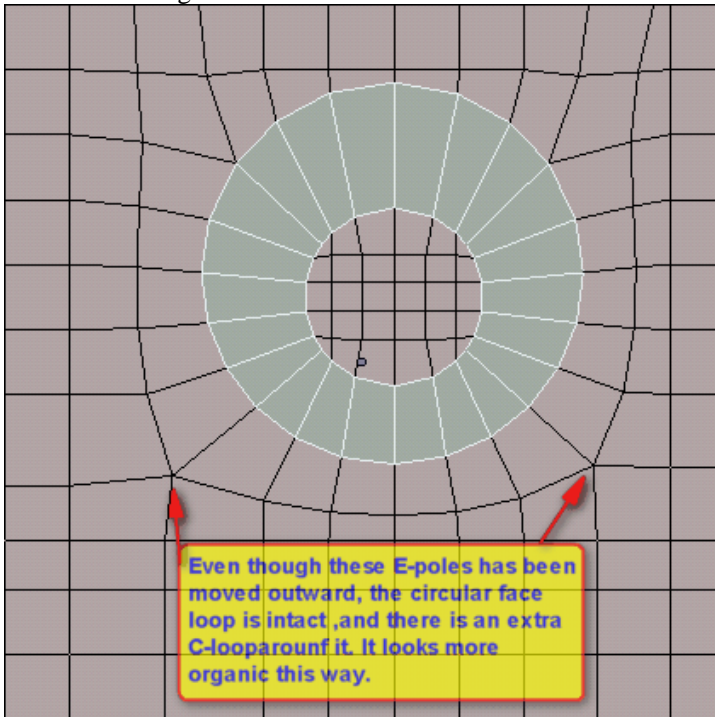
Even though these E-poles has been moved outward, the circular face loop is intact ,and there is an extra C-looparounf it. It looks more organic this way.

I'm no expert, so if you guys have some thoughts about this, spill it.
IMO, by adhering to these points, one can make nice flows that seems to flow across over the whole mesh, giving an impression it looks woven and clean. I think that mechanical modeling is all about isolation, and organic modeling is about including, sharing and intertwining loops on the surface of the mesh.

Lot's of people struggles with the fact on how to make nice flows that transcends perturbations like the nose, limbs etc.

For example, in those professional looking wire frames, you'll see how nice the loops of the chest flows nicely into the the shoulder and how nice it is connected to the bicep etc, I'll be breaking that down too, comparing it to how a noob (me :b) would do it and how a good modeler (me 😊) would do it.

To be continued.....

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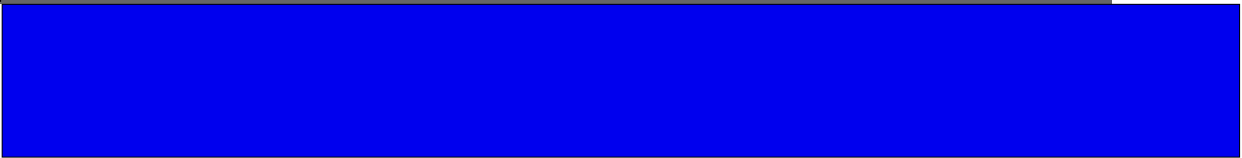🖼 *The Pole - Page 11 - Subdivision Modeling*

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└🗀 **The Pole**

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#**101**
☐ 10-28-2006, 12:14 AM

SSwayne
●
Tryin To
UnPoop
My
Loops

Join Date: Oct 2006
Location: Washington, USA
Posts: 2

🔸

From what I've gathered, from the better tutorials I've come across, as well as somewhere on someartist's blog (or his thread on Wings3D form), it is recommended to spin an edge or two of a newly extruded area, which results in the area being much more "blended" with the rest of the mesh, pretty much what you've accomplished in the last image of your last post. I've started to do it in my modeling adventures, and it's certainly improved my results.

Like you said, you get some side-effect loops happening when you spin edges, so for noobs like me it can add to the confusion... but I try to look at fixing the trash loops as the opportunity to practice all these techniques.

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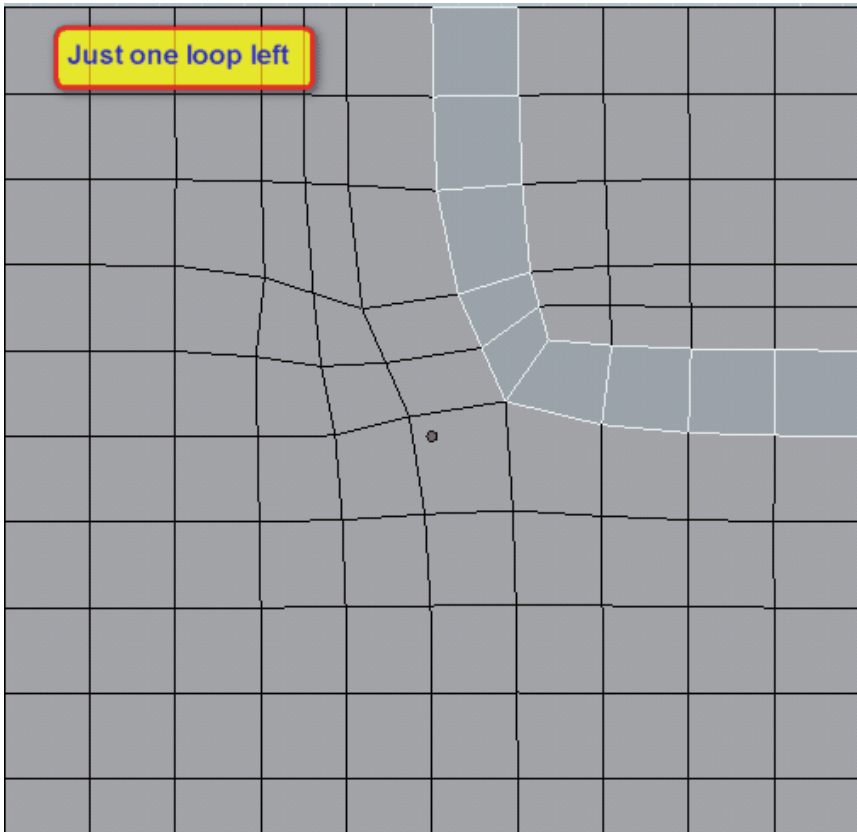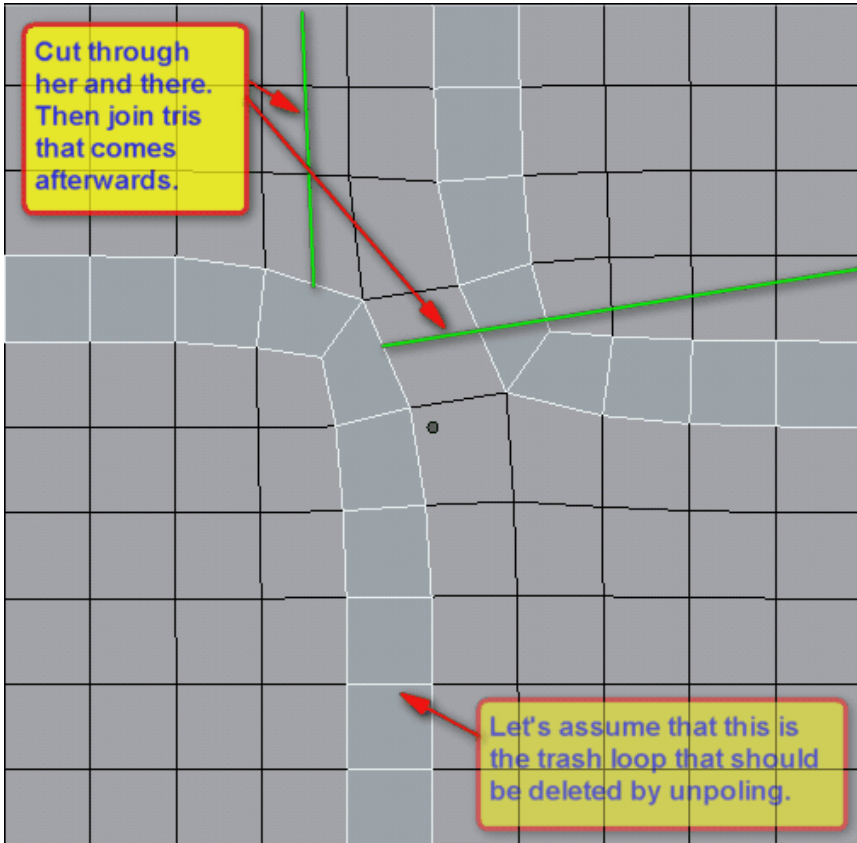Add SSwayne to Your Buddy List

#**102**   ⊡
☐ 10-28-2006, 08:59 AM

Toontje
●
Bachelor/
Ingenieer

Join Date: Jan 2006
Location: Bonaire N.A.
Posts: 58

Don't worry, side effect loops can easily be eliminated by unpoling it. SomeArtist showed how that is done. It is shown too in the first page of this thread I think. Just cut across both sides of the E-pole and merging some tris afterwards. So, keep modeling and keep unpoling 😊

Cut through her and there. Then join tris that comes afterwards.

Let's assume that this is the trash loop that should be deleted by unpoling.

Just one loop left

Last edited by Toontje : 10-28-2006 at 12:55 PM.

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