

Aspects Of Ultimate Polydactyly

by [skin2279](#)

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What's the world record for the maximum number of fingers on one hand? Or, to narrow it down a bit, what's the maximum number of *fully-formed* fingers on one hand? Even further, what's the most *fully-formed, functional* fingers anybody has ever had?

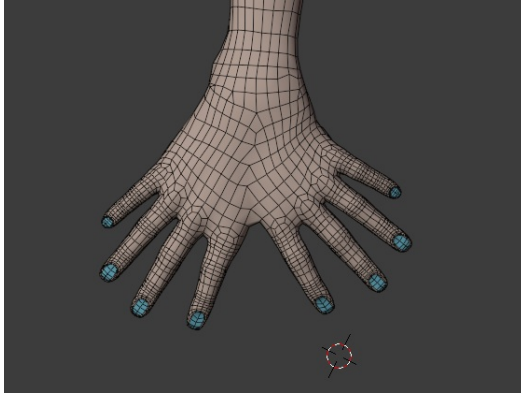
You may have seen pictures of something called *mirror hand*. In this, the thumb always seems to be missing, while the remaining fingers are doubled in a mirror arrangement. The ones I have seen have 8 fingers on one hand. Let's take this as the maximum practical number of fingers to have on one hand. And while real-world examples may only have this unusual arrangement on a single hand, let us imagine it is symmetrical on both hands, and for good measure extend a similar idea to the feet as well.

The next question is, how do we arrange the extras, particularly on the hand? Can we come up with a workable arrangement where a hand with so many fingers can actually be functional? Can the duplicated fingers be functional replacements for the missing thumb?

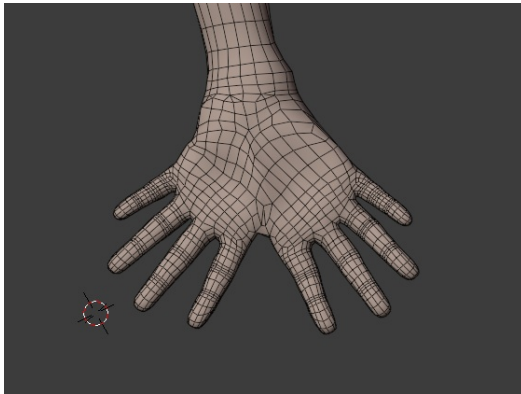
Just to be clear, I am not worrying (much) about actual biology and anatomy here: I just want a 3D model I can do convincing poses and animations with. As usual, I start with a base mesh from [MakeHuman](#), and perform my own surgery on it in [Blender](#) to come up with my models.

Note: All the images in this article are just screenshots, not proper renders. Think of this as a collection of ideas in progress, not any final work. Will you see renders based on these concepts from me in the future? Perhaps. Stay tuned...

The first arrangement I tried was a straightforward mirroring of the fingers and toes, as suggested by the "mirror hand" name. This arrangement looked quite pleasing: I decided to call it the "**butterfly hand**".

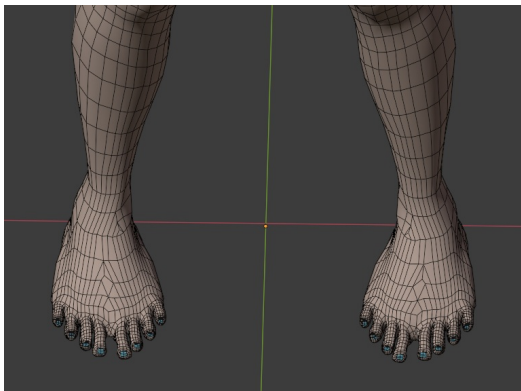


Fingers Open In The Mirrored Arrangement—Above



Fingers Open In The Mirrored Arrangement—Below

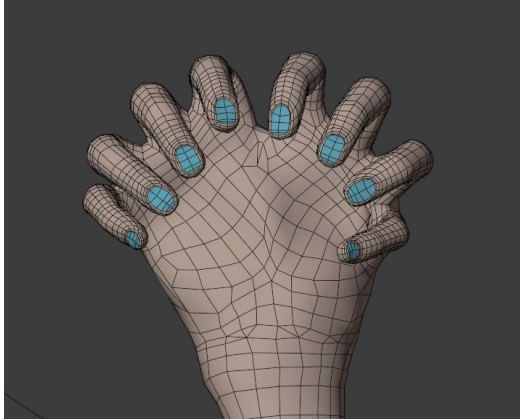
It is possible to do something similar for the toes:



Toes In The Mirrored Arrangement

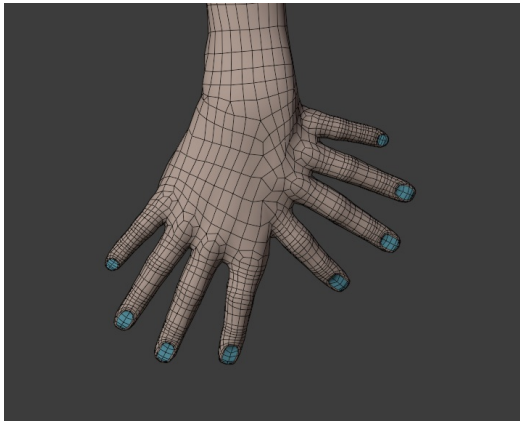
While they are a bit wide, you could conceivably fit these feet into suitably-proportioned shoes.

The problem I had with this was how to pose the hand: what kind of grip would such a hand have? I had to practically fold it in half in order to get the fingers to oppose. The results were not pretty—I will spare you the images, and just give one illustration of the problem:

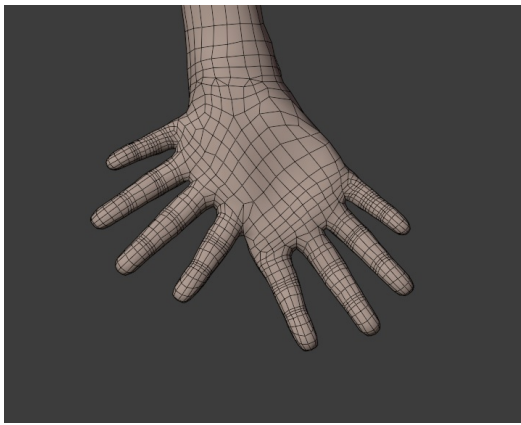


Mirrored Arrangement—Trying To Grip, But How?

So then I started again. This time, I tried keeping the outer fingers closer to their conventional position, but offsetting the inner ones and angling them to take an orientation more like a row of thumbs.



Fingers Open In The Initial Offset Arrangement—Above



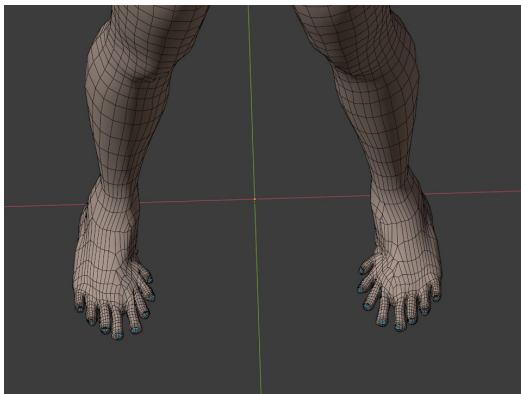
Fingers Open In The Initial Offset Arrangement—Below

Of course, a similar rearrangement of the toes is possible:



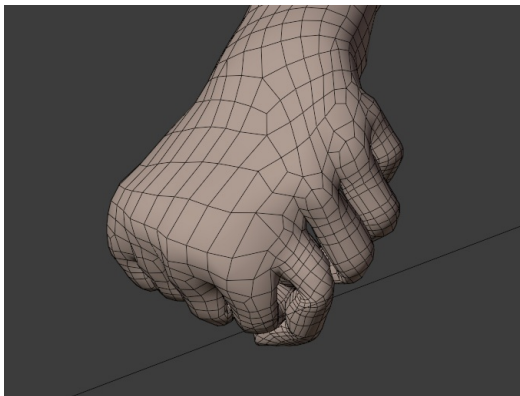
Toes In The Offset Arrangement

These toes can easily be posed a bit more forward, perhaps to fit into suitable footwear:

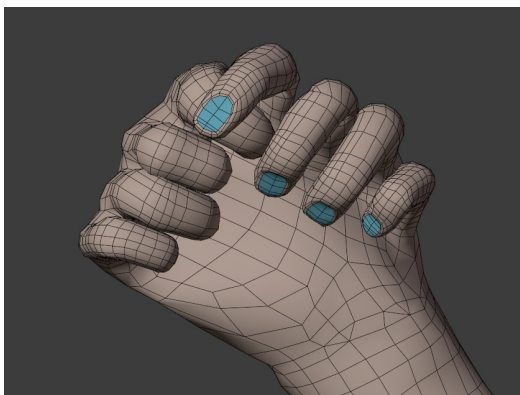


Toes In The Offset Arrangement, Pointing Forward

This hand arrangement allows for the formation of a semi-believable fist:

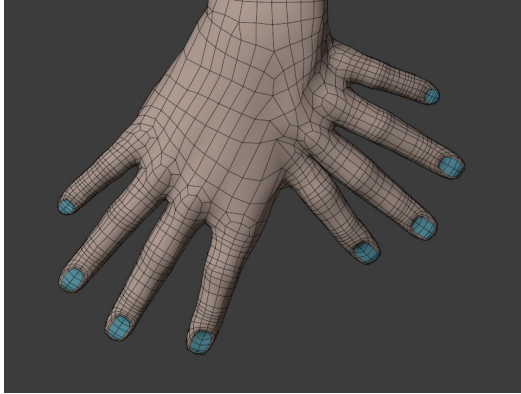


Fist In The Initial Offset Arrangement—Above

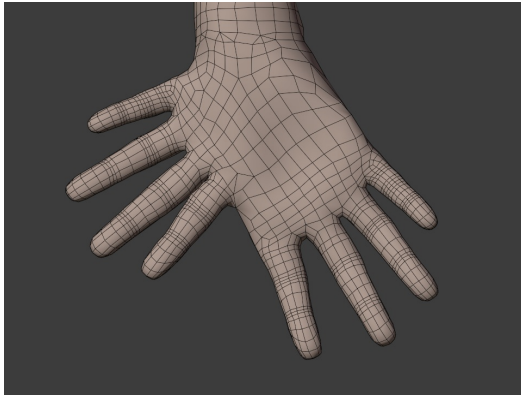


Fist In The Initial Offset Arrangement—Below

I still had trouble making the hand grasp things in a convincing fashion. But after further thought, I came up with a fix: just widen the gap between the inner and outer fingers.

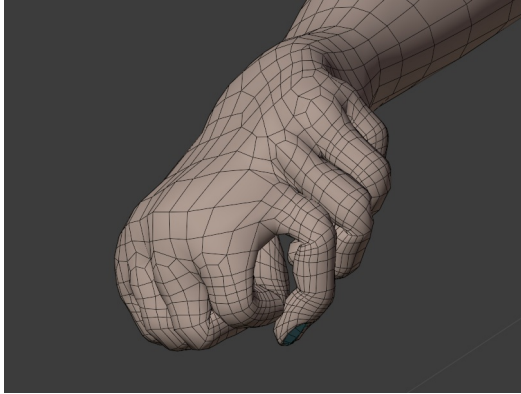


**Fingers Open In The Adjusted Offset Arrangement—
Above**

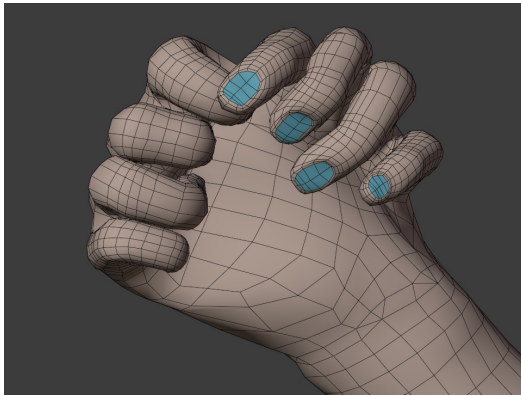


**Fingers Open In The Adjusted Offset Arrangement—
Below**

That may not look like much, but it allows the inner index finger to work more effectively as a thumb:



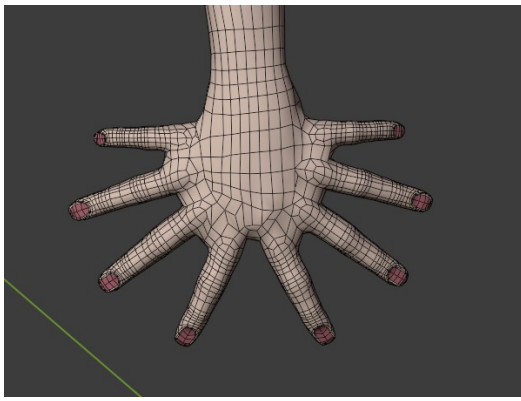
Fist In The Adjusted Offset Arrangement—Above



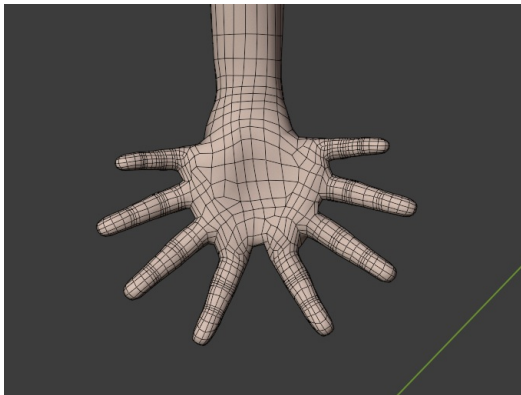
Fist In The Adjusted Offset Arrangement—Below

So, the “butterfly hand” idea can be made to work.

However, I came up with something that may not occur in nature, but which I believe is actually a bit more functional: the “**spider hand**”.



Fingers Open In The Spider Arrangement—Above



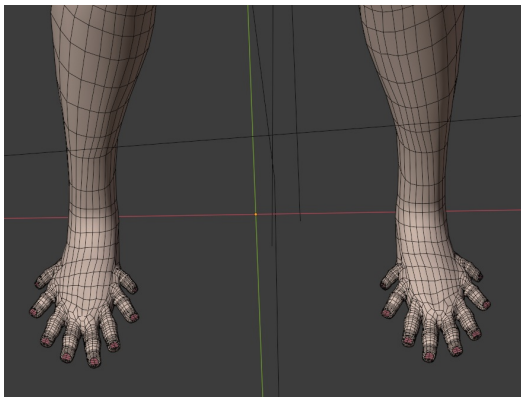
Fingers Open In The Spider Arrangement—Below

For the legs, I decided to start with hands and fingers instead of feet and toes, because why not?



Foot-Fingers In The Spider Arrangement

It is possible to dynamically reportion these to look more like feet and toes:



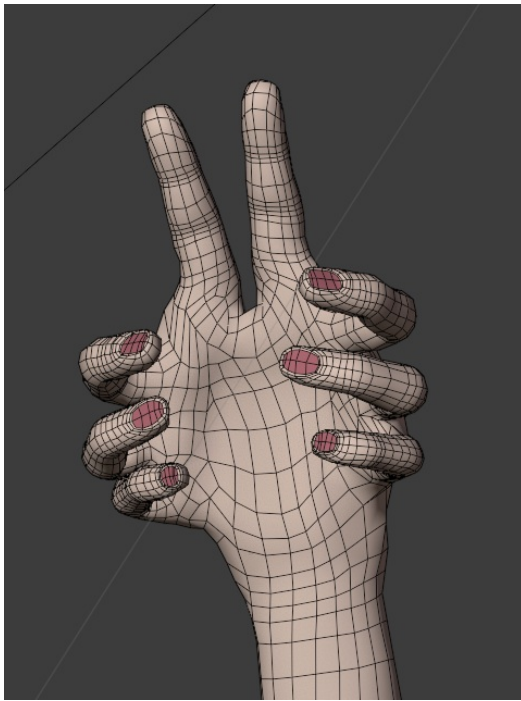
Foot-Fingers To Foot-Toes 1

And also move the toes forward to make for an even more foot-like appearance:



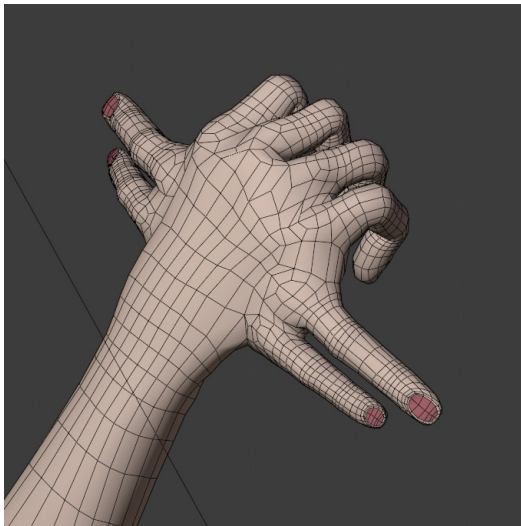
Foot-Fingers To Foot-Toes 2

As an example of the kinds of gripping poses possible with the spider hand, I came up with one I call the *parallel grip*, where the long dimension of the object is roughly parallel to the forearm (e.g. a sword or tennis racquet):



Spider Hands—Parallel Grip

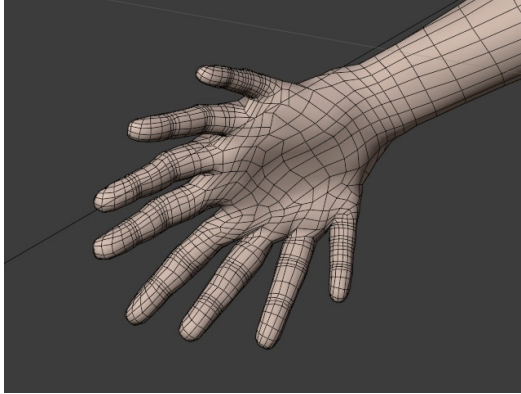
and one I call the *transverse grip*, where the long dimension goes across the hand:



Spider Hands—Transverse Grip

In both cases, the fingers that are out straight are meant to be lying against the long side of the object.

And here is a simple relaxed pose with the fingers roughly together instead of spread:



Doing Nothing In Particular

So I think this is the most versatile option. This could be even better than a conventional hand!
Comments welcomed...

