

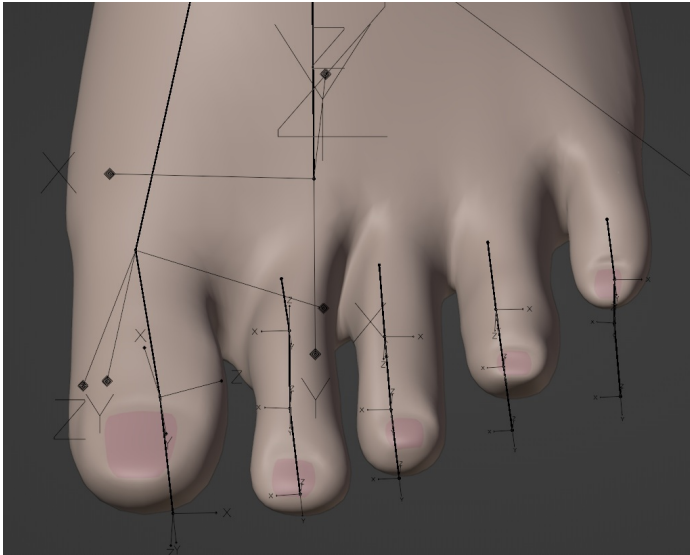
# Rigging Feet And Toes

by [skin2279](#)  
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This document will describe how I do some of the rigging of the models that feature in my poses. As I have mentioned elsewhere, I don't create my human meshes from scratch; I start with a mesh from the [MakeHuman project](#), which I then modify in various ways, great and small.

All modelling described here is done with the [Blender](#) 3D software app.

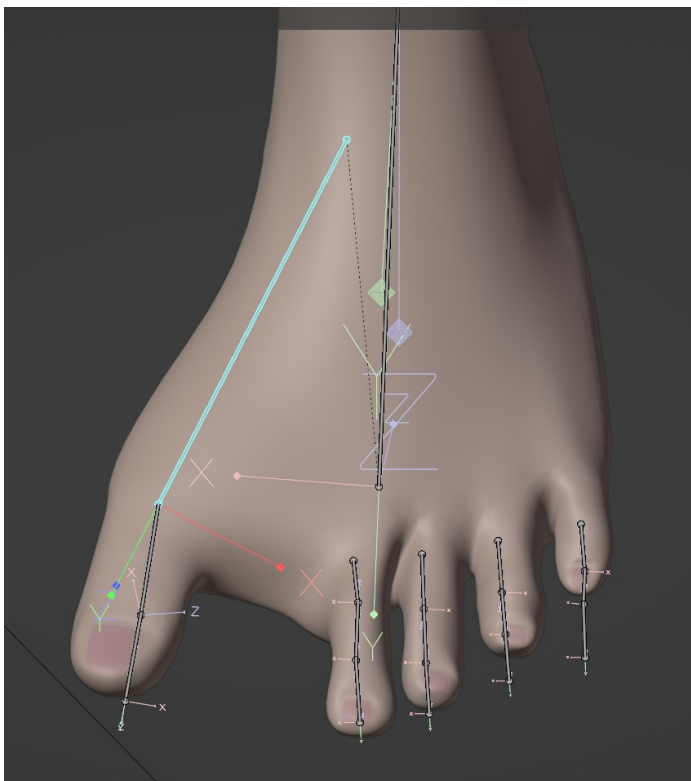
I also create my own rigs for posing the models. These rigs usually include armature bones for every toe. This way, I can do the unconventional kinds of poses that you can see in my galleries.



Each Toe Individually Rigged

Notice I don't use IK bones. I find them fiddly to manage. So I rely on Blender's "Auto IK" feature a lot.

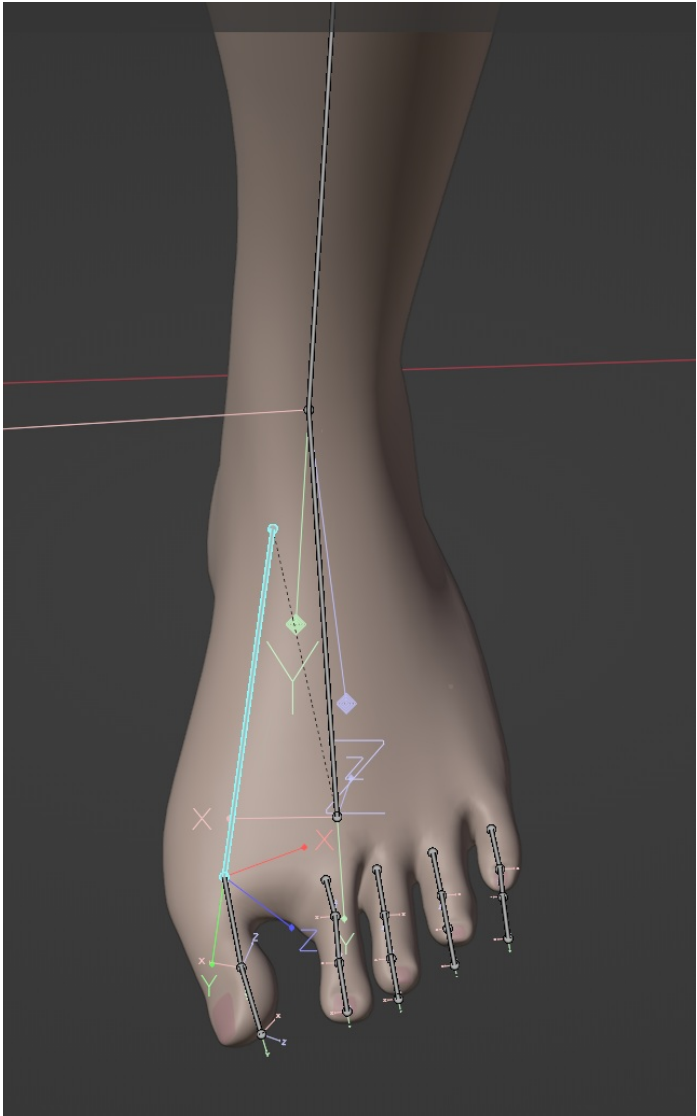
One of the basic things this rig allows me to do is move the big toe separately—something which would be anatomically impossible in a real foot:



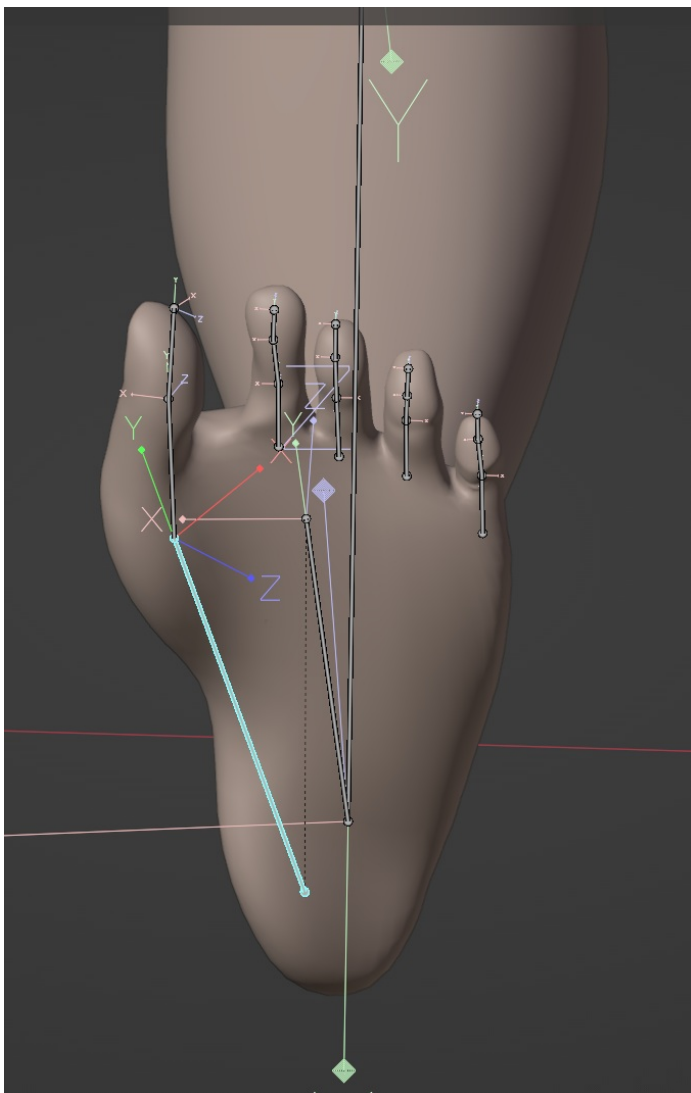
Big Toe Becoming Thumblike

You can see how this allows poses where the foot works more like a hand. But I can do even more.

But there's more: bones can be rotated. If you look at a human hand, the thumb is not oriented parallel to the other fingers, it is rotated somewhat along its longitudinal axis. By doing a similar thing to the big toe, I can make the foot look even more handlike.

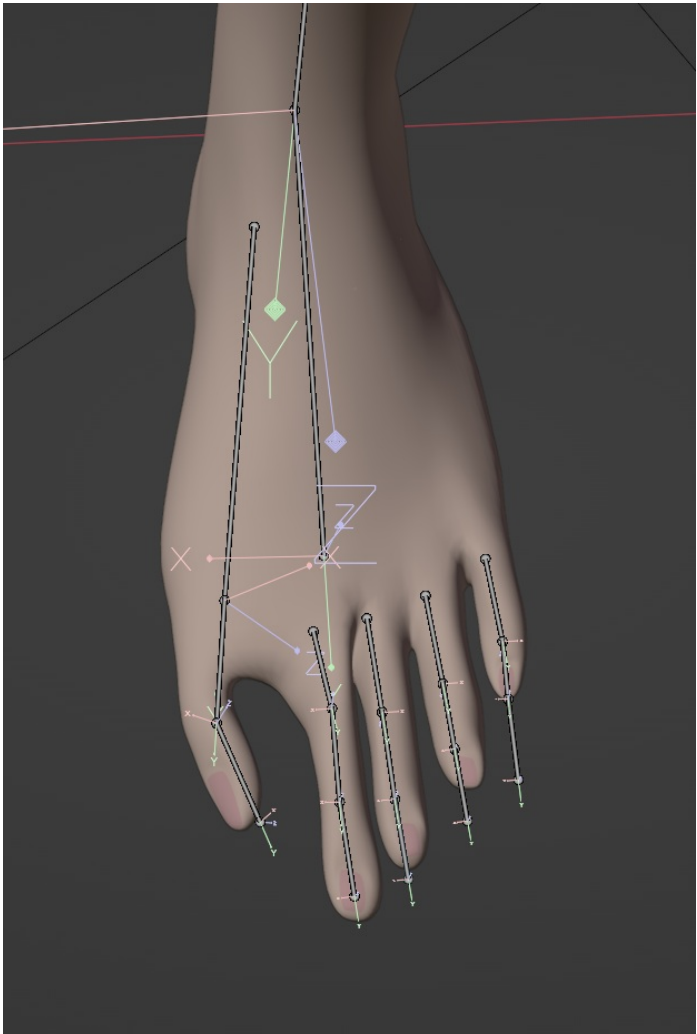


Rotation Makes It Even More Like A Thumb (From Above)



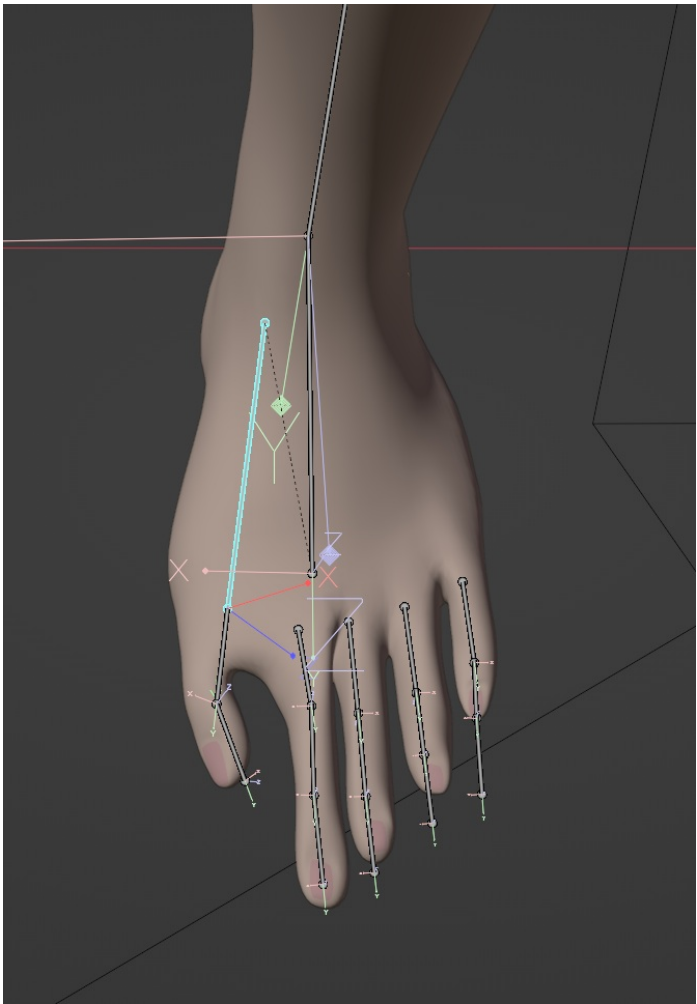
Rotation Makes It Even More Like A Thumb (From Below)

And even more: why not lengthen the toes (scaling the toe bones along the Y-axis), so they look more like fingers. The big toe can benefit from some narrowing, to enhance the thumblike look.



Lengthen The Toes, And They Look More Like Fingers

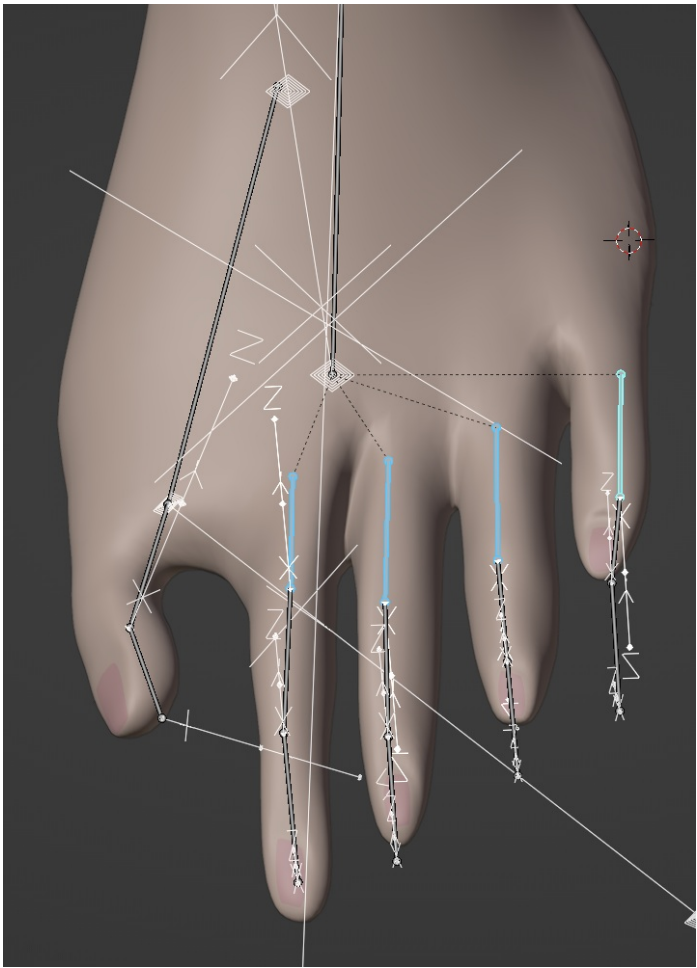
Also shorten the foot bones, so the overall proportions become more like a hand.



Shorten The Foot, And It Becomes More Handlike (From Above)

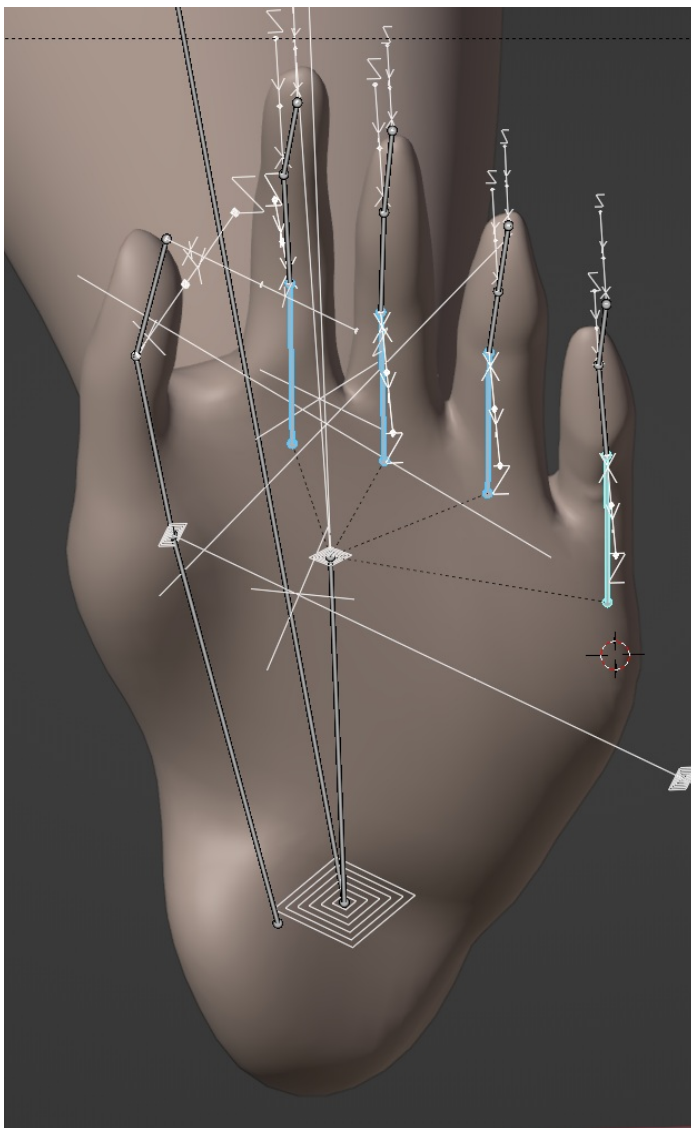


Make the tips of the toes more narrow, to enhance the resemblance to fingers:



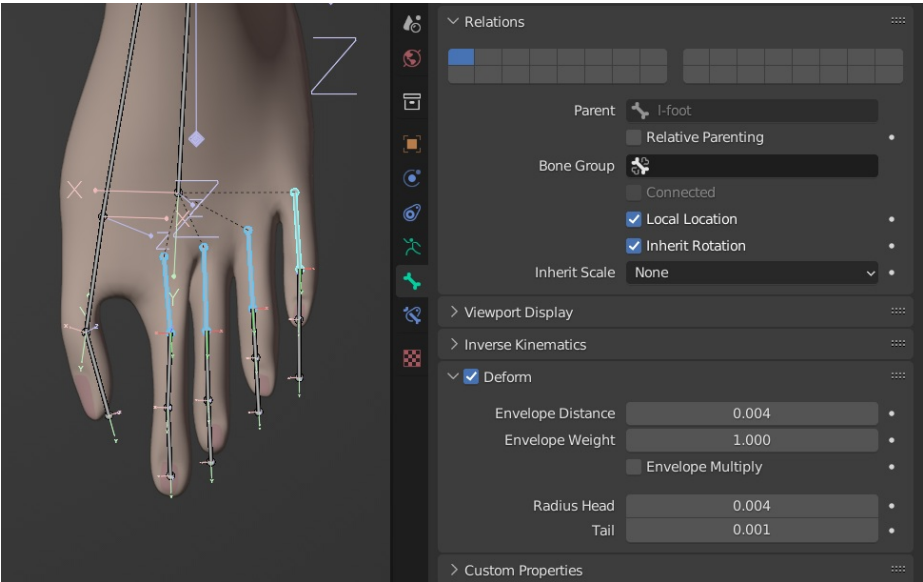
Thinner Toetips Look More Like Fingertips (From Above)





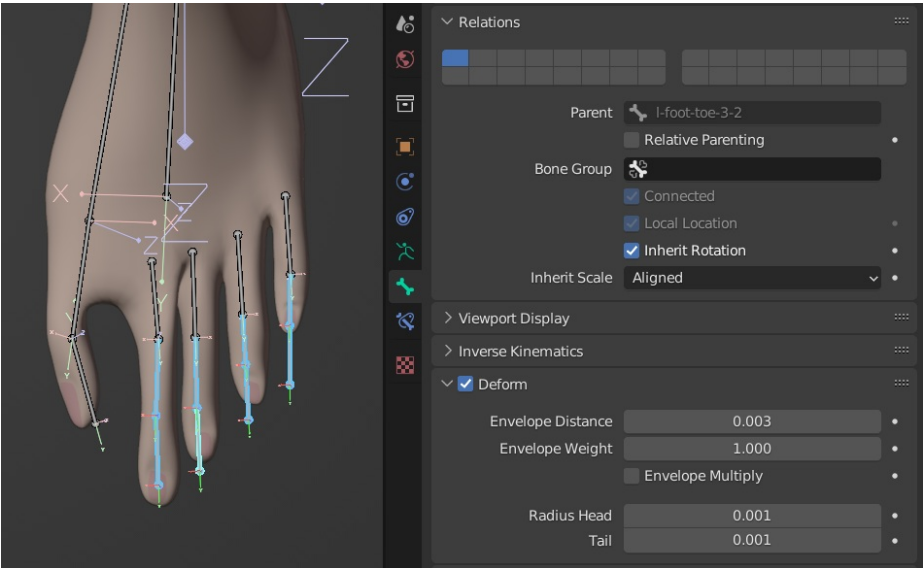
Thinner Toetips Look More Like Fingertips (From Below)

But note a few things about the relationships between the bones. The ones highlighted here have their “Inherit Scale” attribute set to “None”. This allows me to scale their parent bones independently of the toe bones themselves, to alter the proportions of the foot itself separately from the toes.



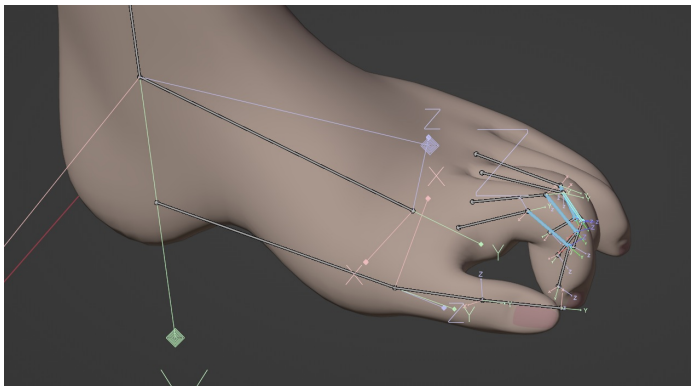
These Bones Have “Inherit Scale” Set To “None”

And the ones highlighted here have the “Inherit Scale” property set to “Aligned”, instead of the default “Full”.



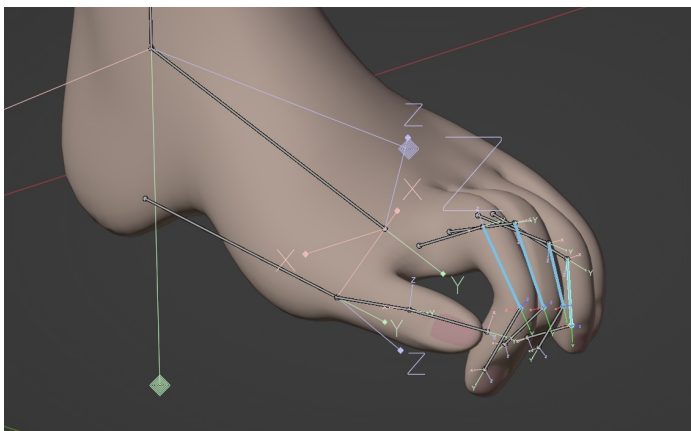
These Bones Have “Inherit Scale” Set To “Aligned”

The difference between “Aligned” and “Full” inheritance of scaling becomes apparent when you rotate scaled bones, like when you curl the toes. With “Full” scaling, you get this odd, blobby-looking effect:



These Bones Have “Inherit Scale” Set To “Full”

while the “Aligned” setting gives you a more natural proportions on the rotated bones:

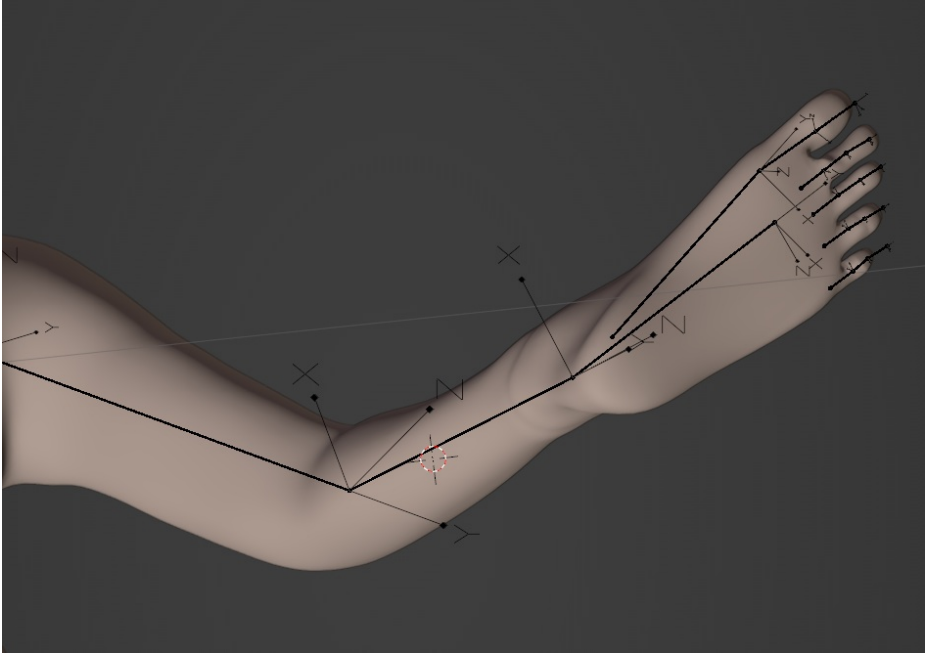


These Bones Have “Inherit Scale” Set To “Aligned”

As you can see, I like to push the boundary between “is it a hand?” and “is it a foot?” — from both directions.

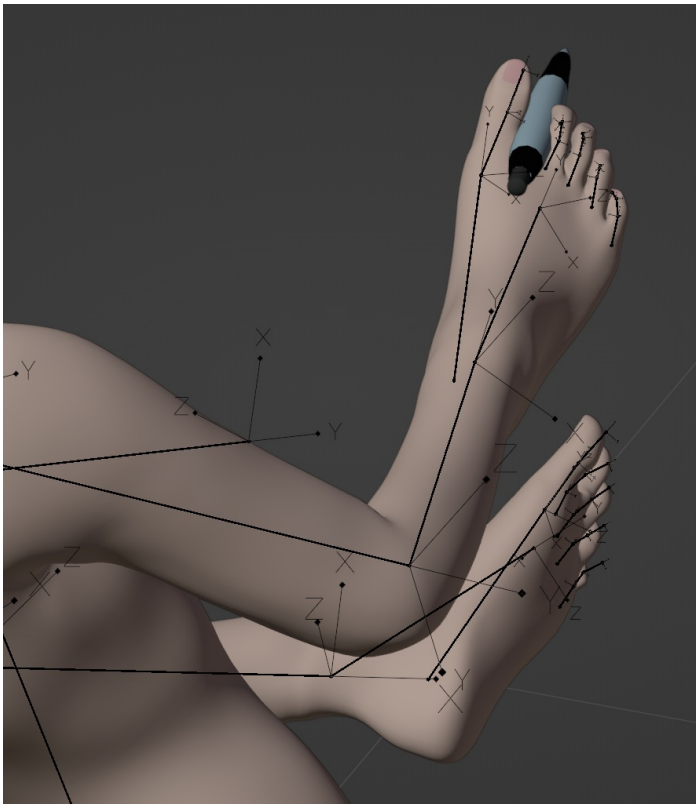
# Feet On Arms

Of course, everything that can be done with feet on legs can also be done with feet on arms.



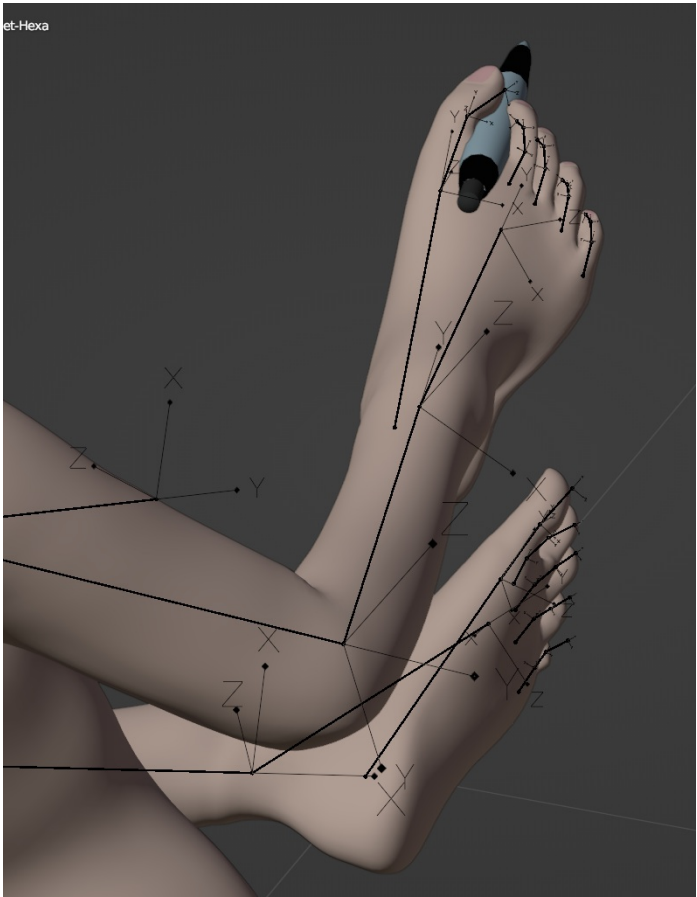
Feet In Place Of Hands

Action poses can highlight conventional foot and toe operation:



Holding Things With Arm-Toes

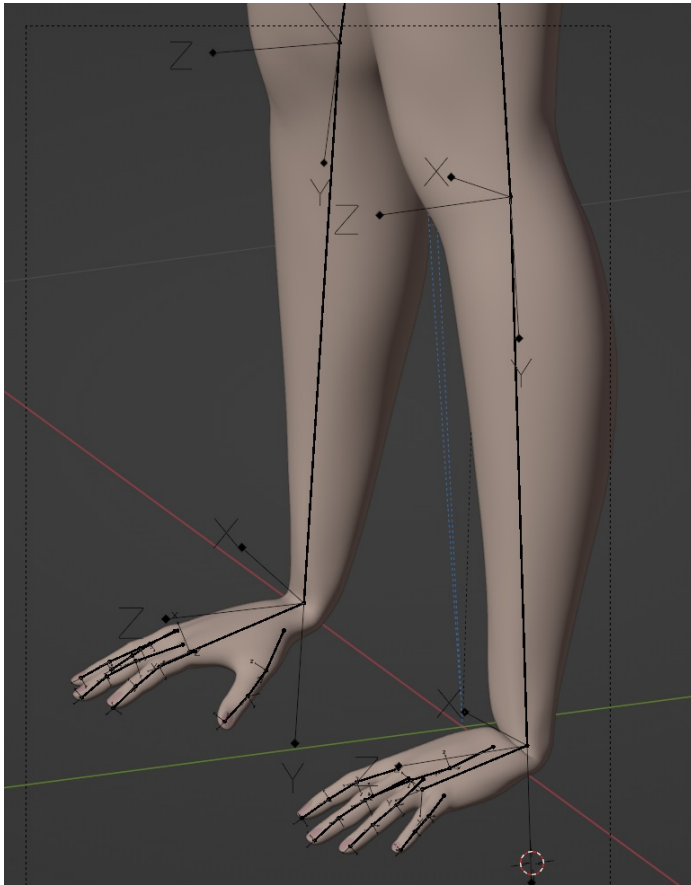
Applying some of the toe rotation we discussed before moves us, subtly, towards a more handlike effect:



Holding Things With Arm-Fingertoes

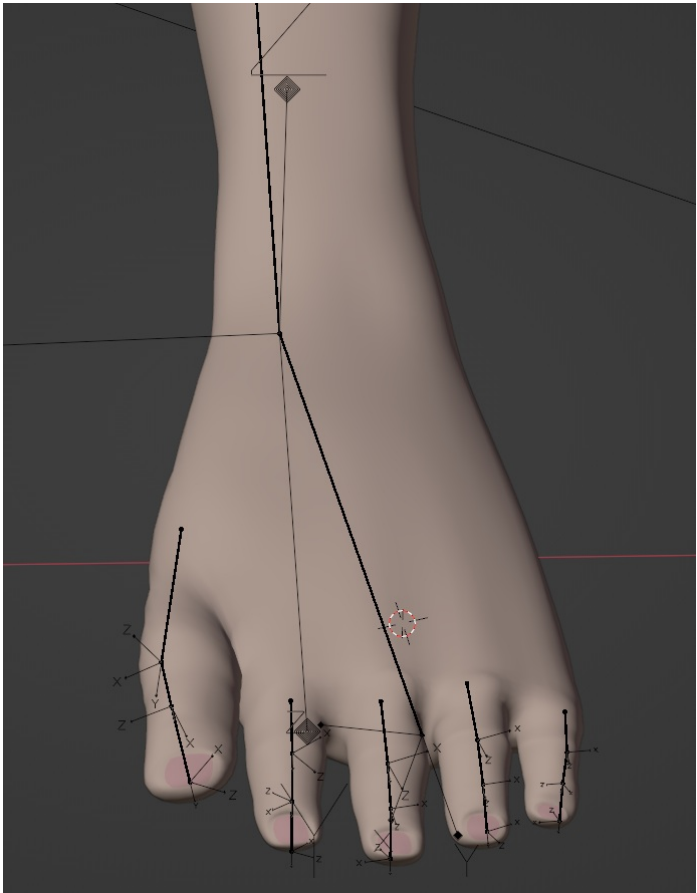
# From Handlike Feet To Footlike Hands

A similar procedure can be applied in reverse, to turn hands into feet. Here is a basic hands-on-the-ends-of-legs mesh:



Just A Pair Of Regular Hands On Legs

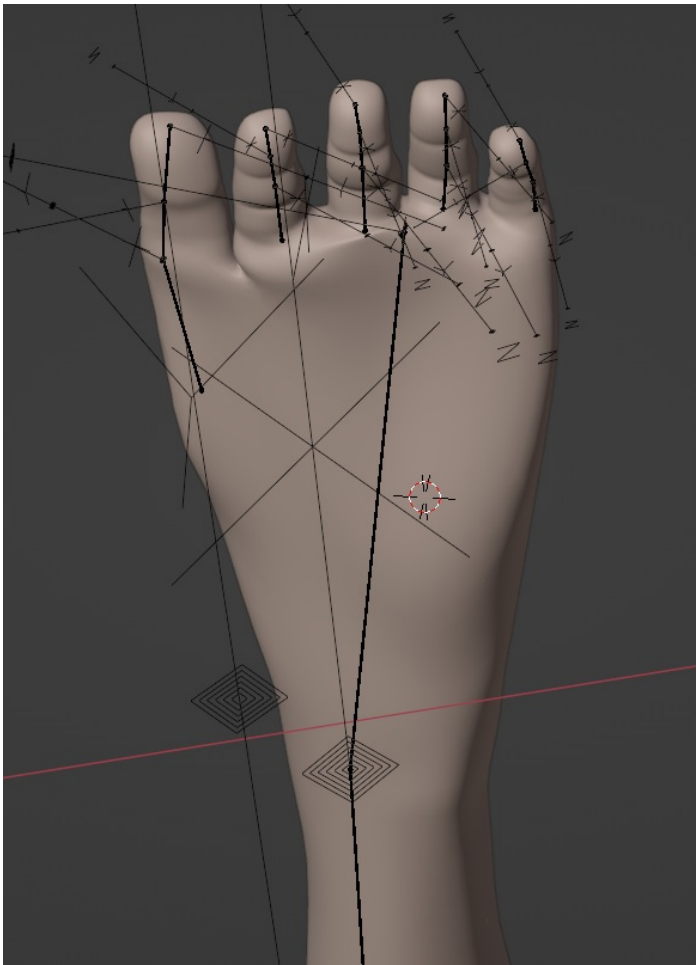
Here with some rescaling and repositioning—note also the rotation of the thumb to be parallel with the other fingers, giving a more toelike appearance:



Shorten And Rearrange The Fingers, Lengthen The Hand



Same thing, viewed from below:



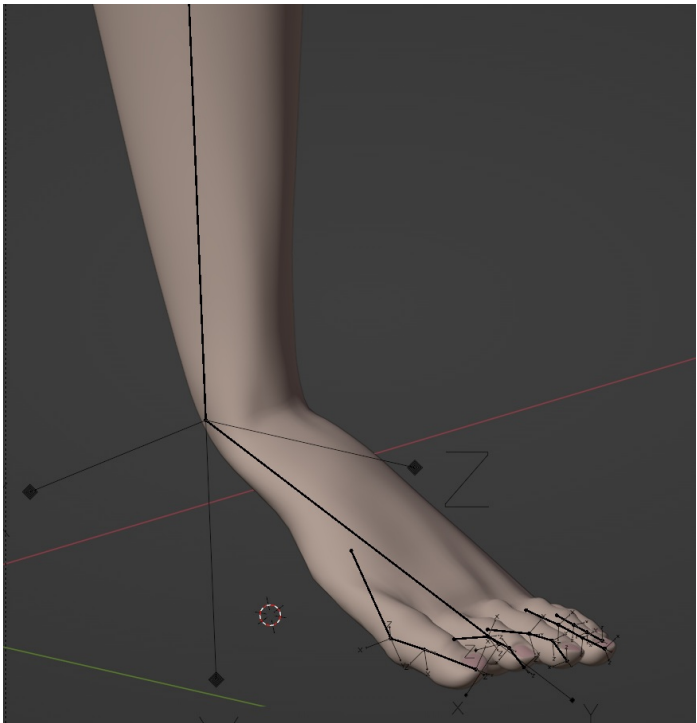
As Above, From Below

Notice there is still one important difference from a true foot, and that is the lack of a heel. Which gives you an interesting standing-on-tippy-toe effect in its own right.

(Or is that “tippy-finger”?)



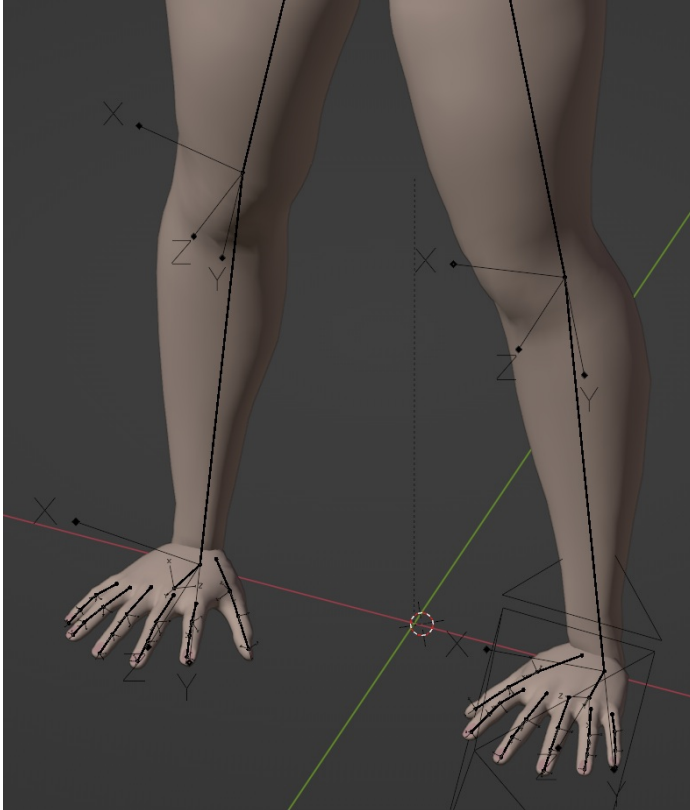
And another view:



Tippy-Toe, Front-Three-Quarter View

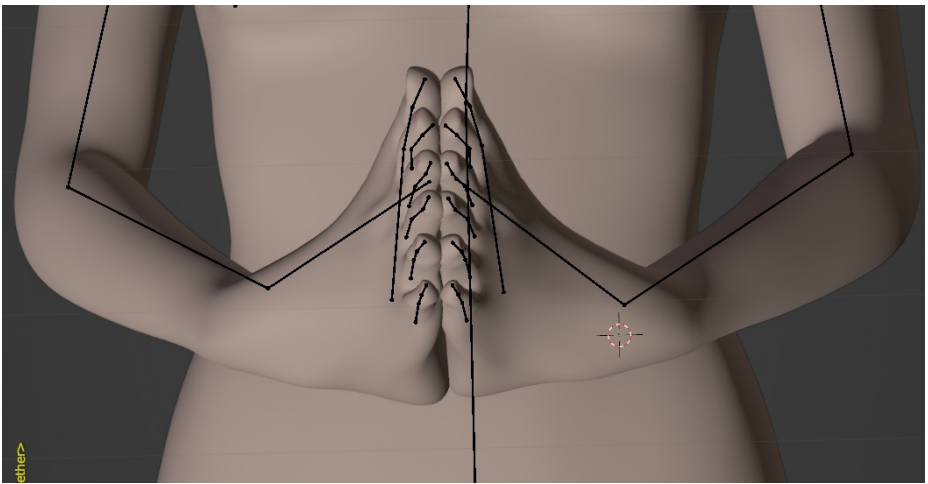
# Why Stop There?

How to take it further? One obvious way is to add more fingers and toes.



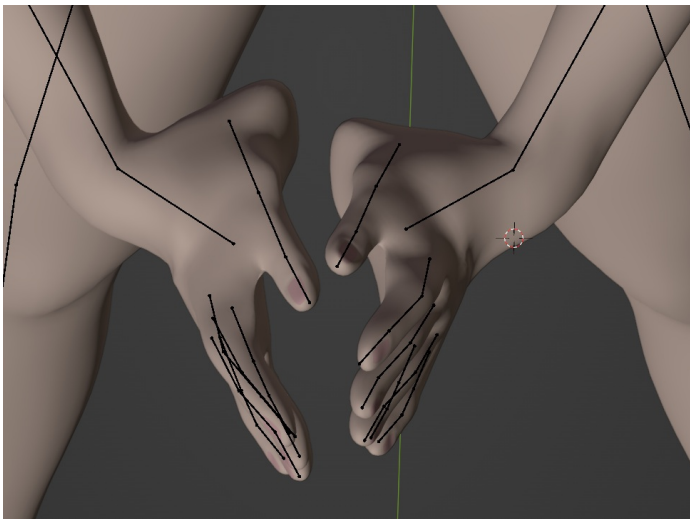
Leghands, With Something Extra

The details are not that different from before, just with more digits to deal with.



Armfeet, Also With Something Extra

Feet on arms, made handlike:



Armfeet, Handlike

And that is just an introduction to the possibilities ...

