

Valens Institute

Homomorphic Acroplasty Project

Report On Subject 29

Introduction

The **Homomorphic Acroplasty Project** is exploring the concept of replacing missing limbs, or parts of limbs, by making copies of existing body parts from the same individual. While at this stage we have yet to recreate a complete limb, we continue to make progress on reconstructions of the extremities. We have now gone beyond the creation of new fingers and toes, to the point where we can produce entire hands and feet.

The Subject

For privacy reasons, the volunteer Subject in this particular experiment will be identified only as "Subject 29". She suffered the misfortune of losing both arms in her teens.



Original State Of Subject

While she had adapted well to the complete loss of these limbs, the adaptation has been less perfect than it would have been had the accident happened earlier in life. Hence, she has frequently expressed the wish for hands she could use to hold things or pick up things. As she has said:

“I can do most things with my feet. But it’s hard to use them as hands and walk on them at the same time.”



Demonstrating Foot Dexterity

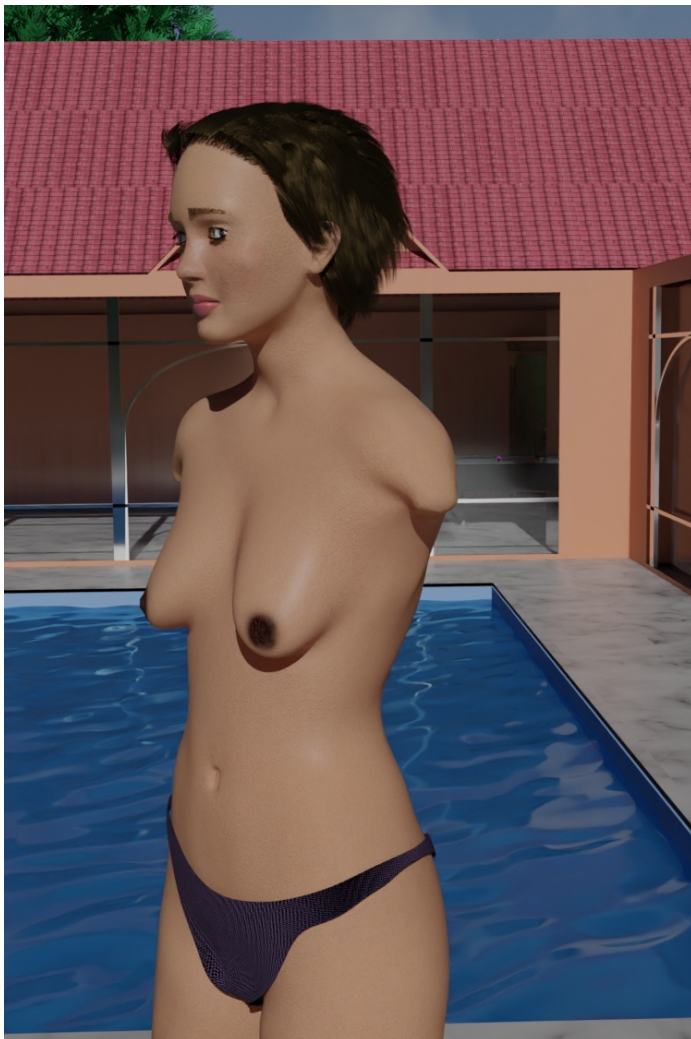


Carrying Things Without Arms

When she heard about the research being conducted at the Institute, she expressed great enthusiasm for taking part. It was made clear to her, as to all subjects, that the techniques involved are not (yet) capable of fabricating arbitrary new body parts, only of making copies of existing ones. So while she had no existing arms or hands that could be duplicated, we could start by creating an extra pair of feet attached to her shoulders, that she could learn to use as replacements for hands.

Stage 1

First we built out the shoulder stumps, to create a basis for the future limb.



Starting Growth

Implantation of the growth triggers led to the formation of the basic form of the foot.



First Month—Discovering New Muscles

Stage 2

The individual toes now began to take form and articulation.

By this point, the subject began training to gain the use of her newly-added joints and muscles. Her attitude was one of great enthusiasm for the changes in her body:

“I’m starting to remember what it was like having hands and fingers! I lost them so long ago, my brain has been completely rewired since then, so when I think of reaching to grab something, it’s my feet and my toes that I reach with. Now I have something extra that I can use. Only it’s not new, it’s something I had before. Yet at the same time not quite like I remember. Familiar, yet different.”



Second Month—Joint Mobility Practice

Final Result

The complete foot construction took three months.



Small, But Perfectly Formed

She is already making more use of her extra appendages. Even in their limited form, she can use her new forefeet to grasp and manipulate things, instead of only having her hindfeet available as hands.



Functional Usage



Coordination

She is discovering new capabilities when using both upper and lower feet to work together. As she says:

“Being so accustomed to using my feet as hands, having an extra pair of feet is like gaining an extra pair of hands.”



Useful To Have More Than Two Hands

But we now have a terminology conundrum. Should we refer to those upper extremities based on their primary function, as “hands”, or based on their form, as “feet”? Remember that her lower extremities were the only “hands” she had before, and continue to function as her primary “hands”.

If we use the same name for all of them, there is a need to distinguish the upper ones from the lower ones. If we call them all “feet”, should we call them “upper feet” versus “lower feet”? How about “forefeet” versus “hindfeet”? Or “front feet” versus “back feet”? One team member even suggested “upfeet” versus “downfeet”.

Conclusion And Future Work

In our continuing series of reports on the Homomorphic Acroplasty project, we can offer another milestone on the long road to the ultimate goal of total body reconstruction. That final step likely remains decades in the future.

In the meantime, research into further extensions of the construction technique continues. For example, we are now attempting to lengthen the attachment of the extremity to the body, to make it more like a fully-articulated limb. This is still in very preliminary stages.

