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**“Rigging” Tests:**

**Test 01- No Mocap Data Involved:** Polygon cylinders were parented to joints and they followed the translation as well as rotation of the joint they are parented to. I then parented the root joint to a locator that was offset from it in space. I animated the locator and the joint and lower joints followed.

**Test02:** I imported a cleaned fbx mocap file. I created a polygon cylinder to represent a femur bone. I parented it to the locator that is the Left Femoral Head. It followed it, but the bottom end of the bone migrated off of alignment with the two knee locators.

**Test03:** I worked with imported mocap data again. I created polygon cylinders to represent the femur, tibia, and metacarpals. I created a joint chain for the legs bones within the locators that represent the dog’s markers. I did “freeze transformations” on all of these. I parented the femur geometry to the femur joint, the tibia cylinder to the knee joint, the metatarsal cylinder to the ankle joint. I then parented the femur joint to the femur locator, the knee joint to one of the knee locators, the ankle (metatarsal) joint to one of the ankle locators, and the top of foot joint to the top of foot locator. I played the animation. The geometry rotated at strange angles and the joint chain was broken. In other words, my bone geometry didn’t stay in proper alignment.

**Test04:** I unparented the joints from the locators, I unparented the geometry from the joints. I deleted the history on the joint chain, did freeze transformations on it. I deleted history on all the geometry and made sure all transformations were at 0. I parented the geometry to the joint at the top of each one. Started by constraining with offset the femur joint to the femur locator. Noticed that through all of this, my knee locator/marker had moved away from the dog in space. Hanging out all by it’s lonesome. Tried unparenting everything. Knee marker still didn’t go back. So, I deleted the motion capture locators from the scene and reimported them. I lost the bone geometry and my joint chain after I did this. So, I had to go back to an old file, export them and reimport them back into the current scene.

**Test05:** I made sure everything was unparented. I froze transformations on the bones and joints. I reparented them. I froze transformations on the bone geometry again (the new step). Then I parented the joints to the dog mocap locators again. Played the animation and the bone geometry was still going off at weird angles.

- **Scrapped idea of being able to parent the joints to the mocap locators.**

**Test06:** I had the bone geometry parented to the joints. But this time, I point-constrained the joints to locators, maintaining offset. When I played the animation, the leg geometry, joint chain, and two of the mocap locators (the top and the bottom one) got left behind.

**Test07:** I undid all the constraints. Tried picking the locator first, then the corresponding joint to constrain it to. Did this for femur. Played animation and the leg geometry followed the mocap locators. Proceeded to set up the constraints on all the joints and their corresponding locators by first selecting the locator then the joint. When I played the animation, the joint chain stayed with the locator data – this is good. But, the bone geometry still rotated off at weird angles.

**Test 08:** I deleted all history. Froze transforms on all geometry. Then reparented, and froze the geometry transformation again. I then proceeded to make each piece of geometry a passive rigid body as described in “Maya Feature Creature Creations” on page 302. I played the animation, and the geometry still flew off the animation skeleton at weird angles. Don’t understand how the author got his bones to stay with the animation skeleton.

- **Scrapped idea of being able to parent the bone geometry to the animation skeleton joints. Will have to try “rigid binding” now.**

**Test09:** Unparented all geometry. Froze transformations on all geometry bones. Deleted all history. Selected the femur geometry and then the femur joint (which still has a point constraint on it) and did a “rigid bind.” Played the animation and the geometry still came off the bone. I successfully detached the femur geometry from the femur joint.

**Test10:** Now I will undo the constraints by selecting each joint and “breaking connections” Then I’ll bind the geometry to the joints before re-constraining the joints to the mocap locators.

**Noticed my local rotation axes were not set to x down the bone. This may have made all the above “parenting” efforts fail.**

So, now I set all the local rotation axes of the joints to xyz with x down the bone and rotate all axes so that Z is always pointing to the left of the dog.

I’ll try reparenting geometry to the joints, and establishing them as passive rigid bodies before constraining joints to mocap locators. I parented each geometry to it’s joint, froze transformation on each one. Selected each geometry and made it a passive rigid body. I then selected each mocap locator and its corresponding joint and set up the point constraints maintaining offsets again. When I played the animation, the geometry flew off the bones again at weird angles.

**O,K. maybe it’s not the Local Rotation Axes being off that caused the problem with parenting.**

**Test 11:** I’ll now attempt to unparent, unconstrain everything again. And try rigid binding the geometry to the bones with the LRAs fixed.

I did all this and am still having problems. Now all the bones are maintaining their original orientation from frame 1 of the animation. The leg geometry is following the mocap locators in translation, but not rotation.

Really confused.

**Test 12:** This time I will create Single Chain IK Solvers on every bone in the chain. I'll then point-constrain the IK handles to the mocap locators. When I did all this and played the animation, the geometry is finally translating and rotating with the mocap locators. However, there is still a problem. The lycra suit I had on the dog makes the dog's appendages appear to lengthen and shorten. Hmmm.

**Found a working solution, but it's not perfect.**