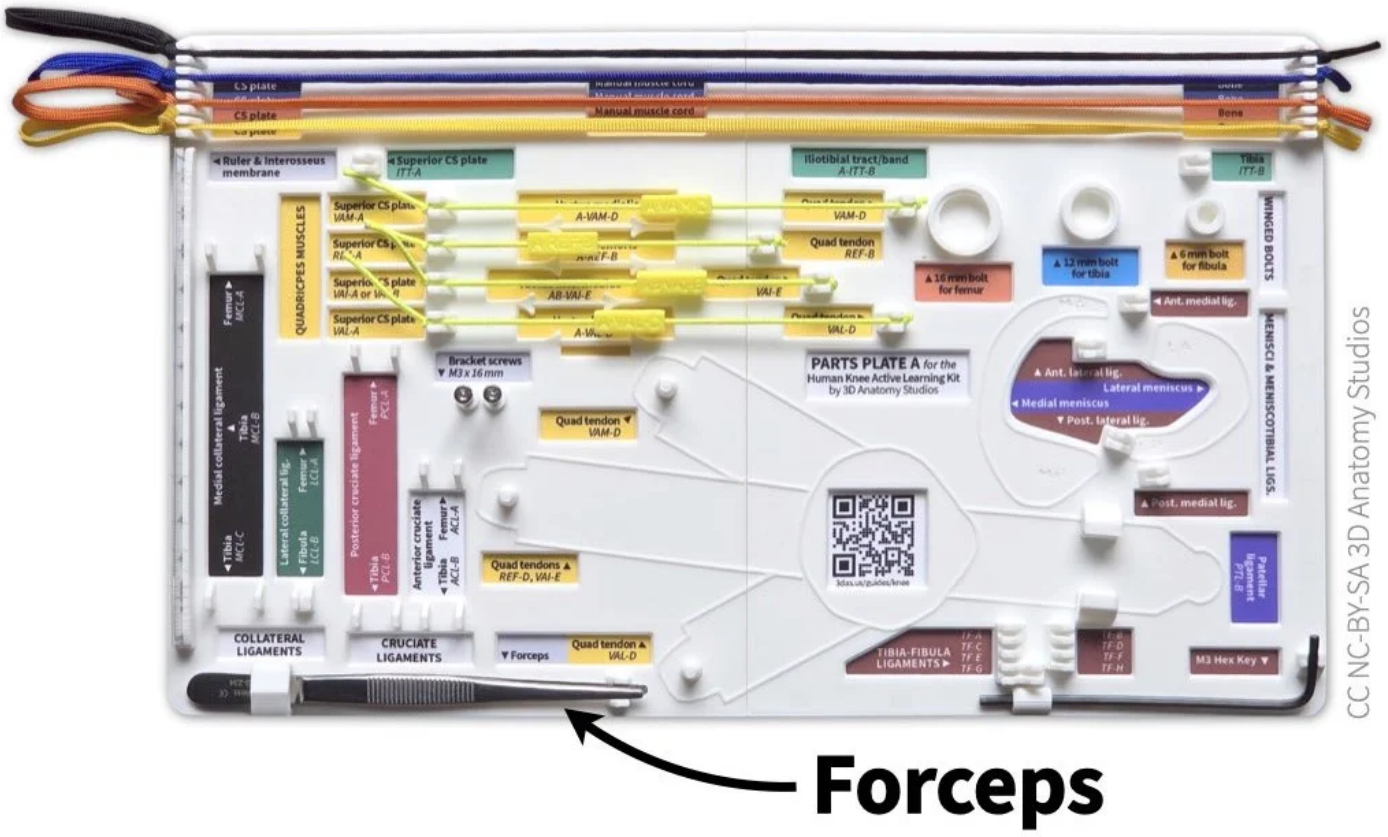
Attaching the elastic muscle cords

Each of the elastic muscle cords ("muscles") in your kit connects to two attachment sites (an origin and an insertion) and represents a line of action for a muscle. To attach a muscle, you just need to know how to the cord ends to one of the three possible attachment site types: a quadriceps tendon clip, an attachment site/hole on the surface of a bone, and an attachment site/hole in a cross-section plate. The instructions below are the same whether the muscle end you're attaching is of the thinner, elastic cord type or the thicker, inelastic cord type.

Materials needed

To attach most of the muscles, you'll need the forceps, located at the bottom left corner of parts plate A.

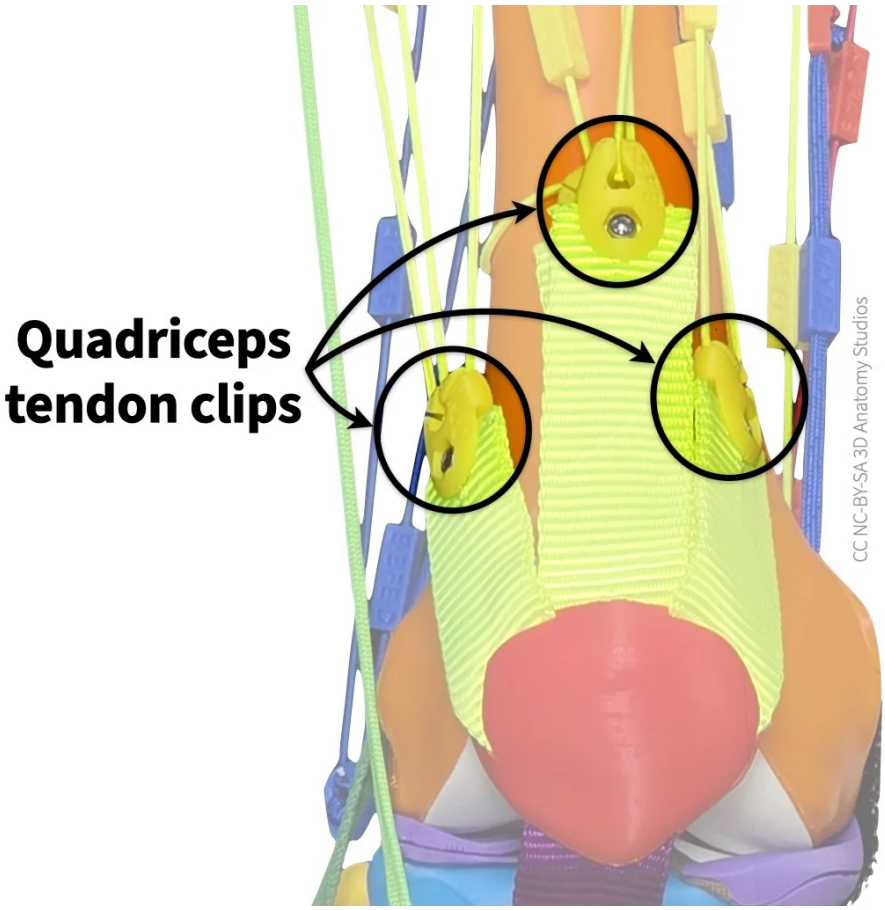


The forceps should be attached to the bottom left corner of parts plate A in your kit.

> Before you attach any muscles, be sure that you understand the muscle color and labeling scheme used in your kit. This will help you easily identify each muscle, its attachment sites, and its corresponding compartment.

Attaching a muscle to a quadriceps tendon clip

The first muscle attachment type is a quadriceps tendon clip. Each of the four quadriceps muscles has a yellow tendon clip, one for each of the four quadriceps tendons (wide yellow straps). These clips have attachment sites for one or up to three cords (one site for rectus femoris and up to three sites for the vasti muscles). Each clip is labeled with the corresponding quadriceps attachment site (REF-B, VAI-E, VAL-D, VAM-D). If you're attaching a muscle to one of the quadriceps tendon clips, attach it first to the clip before attaching it to the cross-section plate or to the surface of a bone.



The quadriceps tendon clips (the yellow plastic pieces indicated by circles) connect the quadriceps elastic muscle cords to the quadriceps tendons (yellow straps). One of the clips (for vastus intermedius) is mostly obscured in the photo above by another clip directly anterior to it (middle clip in the photo, for rectus femoris).

To attach a muscle to a quadriceps tendon clip, insert the end of the cord with a shorter "tail" (cord after the knot) into the hole and pull the cord into the slot to lock the knot in place, as shown in the video below. When inserting the cord into the clip, be sure that you insert the cord through the labeled side first (you should see the clip label as you're inserting the cord). If one end of the cord has a longer "tail" than the other (the bit of cord after the knot), attach the end with the *shorter* tail to the clip.

Video showing how to attach an elastic muscle to a quadriceps tendon clip. The first half of the video shows steps from a front view of the clip; the second half of the video shows the same steps from a side view of the clip.

Attaching a muscle to a bone

The second attachment type is the surface of a bone. These are the keyhole-shaped holes (with accompanying labels) that you see all over the surface of the bones of your kit.

An example of an elastic muscle cord (red) attached to a bone (orange) and the attachment site label. In this example, the cord represents one of the action lines of the adductor magnus muscle ("AMA") and the attachment site is "AMA-D."

Inside each of these keyholes is a hook that catches the knot of a cord and holds it in place as long as the cord is pulled within the normal action range of the corresponding muscle. This means that for all of the motion simulations you perform, the cords will stay attached even though they are simply hooked into place. If you're attaching a muscle between the surface of a bone and a cross-section plate, attach it first to the bone before attaching it to the cross-section plate. If you're attaching a muscle between the surface of a bone and a quadriceps clip, attach it first to the quadriceps clip before attaching it to the bone.

To attach an elastic cord to an attachment site on a bone's surface, push the knot's cord into the hole using forceps and then pull the cord through the slit of the keyhole to pull the knot into the internal hook, as shown in the video below. If one end of the cord has a longer "tail" than the other (the bit of cord after the knot), attach the end with the *shorter* tail to the bone.

Video showing how to attach a muscle cord to an attachment site on the surface of a bone.

Attaching a muscle to a cross-section plate

The third and last attachment type is a cross-section plate (either the superior or inferior one). The cross-section plates have the same keyhole-shaped holes as the surface of the bones, each located within the indentation of the corresponding muscle.

The superior cross-section plate from your kit, as seen from an inferior view (looking up from the knee). The keyhole-shaped holes and labels are muscle attachment sites.

Attaching a muscle to a cross-section plate is easier than attaching it to the other two attachment types. For this reason, whenever you're attaching a muscle that connects to the cross-section plate, attach it to the plate last; that is, attach it to a quadriceps tendon clip or to the surface of bone and *then* attach it to the cross-section plate. To attach a muscle to a cross-section plate, thread the cord and knot through the hole and then slide the cord into the keyhole slit to secure the knot in place, as shown in the video below. If one end of the cord has a longer "tail" than the other (the bit of cord after the knot), attach the end with the *longer* tail to the cross-section plate.

Video showing how to attach an elastic muscle to a cross-section plate. Insert the cord first through the labeled side and then pull the cord into the slit from the opposite side to secure the knot in place.

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