

Healing Passage

6th Ed.

Pelvic Floor Model

Instructions & Patterns

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This is a 3D anatomical model of the pelvic floor as it is currently understood in healthy, living women. A full explanation of this anatomy can be found in the text. Obtain a full copy of the text at www.midwiferybooks.com.

THREE-DIMENSIONAL MODEL OF THE LEVATOR ANI COMPLEX

Now here is a really fun project which should cinch your understanding of the pelvic musculature. Even with my own experience of writing this book, I really didn't fully understand how all the muscles work together until I ordered a model of the pelvic floor and started to work with it in three dimensions. However, that model, upon which the previous paper model was based, was shaped like a bowl. The new model of the levator ani complex included here has been modified to show the muscles toned and uplifted, as they are in life. It can be constructed with materials that are readily available from a craft store.

The model is roughly life size and includes its own, modified representation of the pelvis into which the soft parts fit. The sides of the pelvis have been left off so that you can more easily see the muscles from all angles. The use of modeling mesh and felt made it easy to show the shape of the muscles, but also made it much more difficult to include numerous additional very small, intermingled parts. For a 3-D understanding of the more superficial parts, refer to my FEMALE PELVIC ANATOMY lessons on the anatomy DVD. As this book goes to press, the anatomy DVD is about three-quarters finished.

Assembly Instructions

NOTE: Before you begin assembly, read through the all of these instructions, referring to the pages of figures that follow as you go.

Tools and equipment

Small ruler with cm increments

2 Pairs of scissors: one to use on the metal screen and another pair for cutting felt and paper.

Both pairs need to be suitable for cutting small pieces accurately

Permanent black-ink marking pen with a small tip to use in mesh and a quilter's disappearing ink marker (available in the needlework section of any craft store) for use on felt

Small, sharp, long-blade Sharpie-type razor knife or new single-edged razor blades for cutting Styrofoam (Be sure that the blade is longer than the round of Styrofoam is thick, or you will not be able to cut out the space in the Styrofoam very easily).

Rolling pin, the largest, heaviest one you have

Needle and thread (If you want to get fancy, have colors to match your felt)

Thimble

Supplies

You will need ten standard 9 × 11" sheets of craft felt of the designated color for each of the following parts. The colors suggested here loosely match those demonstrated in the pelvic anatomy DVD. Use of similar colors will help you identify each part.

- 1) Medium (cadet) blue: puboanalis muscle
- 2) Lighter blue than (1) for fibers that run from the pubic bone to the coccyx that form the tendinous plate of the pubococcygeus
- 3) Aqua or turquoise: puboperinealis muscle

- 4) Green: iliococcygeus muscle
 - 5) Light yellow (lighter than [8]): coccygeus muscles
 - 6) Deep rose: puborectalis muscle
 - 7) Light pink: yoni canal
 - 8) Gold (darker than [5]): urethral canal
 - 9) 2 squares of off-white, cream or ivory felt for the sacrum and pubic bone
- 1 package Activ-Wire Mesh 12 × 24" sheet (Small, 1/8 × 1/16" mesh) (This is a very fine sculptural and modeling wire mesh and may be the hardest item to find. Jo Ann Fabric stores carry it in the States. If you cannot find it, here is the source info: Item #166 made by Activa Products, Inc., Marshall, TX 75671, 800-883-3899/903-938-2224, www.activaproducts.com. If you are a student, talk to your class about ordering enough for all of you. They also sell this mesh in a large roll, which a school or group of students could buy and then sell by the piece.)
- 1 Styrofoam disc, 1" thick × 8" in diameter (This size can also be hard to find, call around. One inch 1" × 8" discs can be ordered from LACrafts.com.)
- 1 small package of strips of nonadhesive white or cream colored hook-and-loop tape (Velcro-type), a length of this tape can also be purchased from a roll in most fabric stores. Hook -and-loop tape is used to create the vaginolevator attachments (shown in red-purple on the DVD).
- Straight pins with flat heads
- A small amount of synthetic pillow stuffing material to stuff into the sacrum to help it hold its shape.

General notes on making the model

Figures: An extensive series of figures is included to help you assemble the model. They are grouped on the 3 pages that follow the instructions. It will help to make single-sided photocopies of these pages so you can refer to them more easily.

Patterns: The patterns have been printed double sided to save space in the text so you MUST MAKE SINGLE-SIDED PHOTOCOPIES OF THEM BEFORE YOU BEGIN. There are both FRAME mesh patterns and FELT patterns in this model. Make sure you are read each piece carefully and use the correct pattern for each type of material. Each piece is numbered and otherwise detailed like a dressmaker's pattern (thanks to Rhonda, an accomplished seamstress).

Working with the wire mesh: Open the package and unfold the mesh. Lay it on a clean, smooth surface and gently stretch and flatten it with your hands (do not stretch it so much that you distort the screen). Use the rolling pin to roll it out and flatten it as much as possible, avoiding creating creases.

There is no need to cut out the paper patterns for making the mesh parts. Lay the mesh over the paper pattern and use the permanent marker to outline the pattern onto the mesh. Use your "metal" scissors to cut the screen. Holding the screen over a piece of white paper may help you see the lines better. Remove wire mesh scraps from your work area to avoid entanglement with the felt.

Notes on working with felt: Be sure to refer to the supplies list as to which color you will use for each part. Felt stretches easily, so if you make a piece a little too short, you can gently stretch the felt to make it fit. If you stretch the felt a little too much, you can trim it to make it fit. Felt also snags easily on the screen mesh, tape and anything else, so it helps to clear your work space and then work with one piece of felt at a time. Remove felt scraps when you have finished cutting out your pieces (store them in a bag, in case you need them).

To make felt pattern pieces, cut out each paper pattern making sure to cut along the outside edge of the bold lines. Then lay the pattern pieces over the felt as close to one edge or corner of the fabric as possible (this ensures that you have enough of that color left for any other pieces you may need to cut out).

Hold the felt and pattern steady with one hand while you trace the outline of the pattern onto the felt with your marker, or use straight pins to pin the pattern to the felt. If you want a pristine model with no marker lines that show, use the straight-pin method for cutting out your pieces or cut just inside your marker lines; make your marker lines on the “inside” face of the felt (the face that will not show), or use a quilter’s disappearing ink marker, the marks will last 48 to 72 hours. Cut along the bold lines with your best scissors.

Carefully copy all designated marks and dotted lines onto the felt (note that some marks do not need to be transferred, so follow the instructions carefully). One way to transfer the marks is to hold the marker on the marks for a moment to allow the ink to soak through the paper and onto the felt. Which side of the felt the marks need to be transferred to varies, so follow directions carefully.

Because felt is difficult to cut compared to some other fabrics and because these pieces are relatively small, do not attempt to stack the felt to cut multiple pieces of the same shape.

Tacking, whipstitching and overlapping: In these instructions, “tacking” refers to using needle and thread to sew basting stitches (Fig 1a) through the specified layer to attach parts together. These stitches may need to be large or small, as appropriate. Long dashed marks on the patterns or on the figure illustrations indicate stitching lines where tacking stitches should be placed.

Whip or overcast stitches (Fig 1b) can also be used when joining two pieces, usually along the edges. Short dashes indicate where a fold should be placed. Dotted lines indicate where edges should be overlapped and sewn together. Please refer to the accompanying illustrations for further clarification.

Fasteners: If you wish, you can put small snaps or hook-and-loop tape at many of the places where the pieces would otherwise be tacked to each other. Such fasteners would allow you to take the model apart and put it back together easily. This is particularly helpful if you will be using the model as a teaching aide. Do not attempt to use “dual lock” fasteners because they are difficult to sew and so thick that they distort the model. Use either black or beige hook and loop tape as a fastener so that you can easily distinguish the anatomical structures represented by white hook-and-loop tape (e.g., the vaginolevator attachments) from the fastenings that merely hold the model together. The instructions below for creating a model that disassembles will include both snaps and hook-and-loop tape. Note that the instructions pertaining to making a detachable model are bracketed by double asterisks (**). If you do

not want to make detachable model, simply skip over these sections.

Creating a model that disassembles takes much longer than creating the model as one piece. It helps to make the model that does not disassemble first, to get a better sense of how the parts go together, before trying to make one that can be taken apart.

Making the model

NOTE: Numbers in parentheses refer to the number on each pattern piece.

Assemble the puboanalis muscle (part of the pubovisceral complex):

1. Trace onto mesh and cut out the **puboanalis muscle, frame (1)**.
2. Cut out the paper pattern for the **puboanalis muscle, felt (2)**. Using the medium blue felt, trace or pin the pattern onto the felt and cut the felt piece out. Be sure to cut along the bold lines, including those extending into the center.
3. Carefully transfer the marks for the vaginolevator attachment, the dots, the center **+**, and the alignment marks for the tendinous plate. There is no need to transfer the fold lines or stitching lines.
4. Place the felt piece (2) right side (the side with the marks) down, and lay the mesh frame (1) on the wrong side of the felt piece, aligning it as illustrated in Fig. 2.
5. Fold the top edge of the felt down toward the center, and the bottom edge of the felt up toward the center, encasing the mesh in the felt. Stitch through all thicknesses with a medium-sized basting stitch along the dashed lines as shown in Fig. 3, approximately 1/8" from the edges.
6. With the transferred marks on the inside, fold the strip in half by bringing the short ends together, creating a sharp crease at the fold line. Create a ridge by whipstitching along this crease, taking a 1/4" bite, through all thicknesses. Stitch only the top half of the structure, leaving the bottom part ridge free, as shown in Fig. 4.
7. Trace onto mesh and cut out the **tendinous plate of the pubococcygeus, frame (3)**.
8. Cut out the paper pattern for the **tendinous plate of the pubococcygeus, felt (4)**. Using the light blue felt, trace the pattern or pin it to the felt and cut the felt piece out. There is no need to transfer the dashed line.
9. Lay the tendinous plate frame (3) onto the tendinous plate felt piece (4). Tack them together using medium-sized basting stitches (or a whipstitch if you prefer), approximately 1/8" from the edge, as illustrated in Fig 5.
- **If you are creating a detachable model, sew one side of a snap on the tip of the mesh side of the tendinous plate. Leave the other side snapped to it so it will not be lost. You will later sew it to the coccyx. Then sew one side of a piece of hook-and-loop tape on the mesh side below the snap. Stick the other side to its mate: you will later sew it to the iliococcygeus. Whipstitch around all edges of the hook-and-loop pieces, as if you were sewing a patch.**
10. Open the puboanalis muscle part out flat, with the ridge side down. Align the tendinous plate at the center top, mesh side down, using the alignment marks, and stitch into place along the stitching lines, as shown in Fig 6.
- **Even if you are constructing a detachable model, permanently affix the tendinous plate to the puboanalis, as these fibers are continuous with those of the rest of this muscle; they

are different colors only to emphasize that these are the only fibers that reach from the pubic bone all the way to the coccyx.**

11. Create the puboanalis cuff by wrapping the flaps of the lower segment of the puboanalis muscle toward you, overlapping the edges slightly. Sew the overlapped edges together using a whipstitch, creating a cylinder, as in Fig 7.
12. Cut out the paper pattern for the **pubococcygeus fibers, felt (5)**. Using the light blue felt (the same color as for felt pattern piece [4]), trace or pin the pattern onto the felt, and cut one piece. Carefully transfer the bold slit line, and cut a slit along that mark.
13. Insert the tendinous plate of the pubococcygeus piece through the slit (Fig 8). Fold the edges of the felt pubococcygeus fibers over the edges of the puboanalis muscle and tack into place using basting stitches through all thicknesses, or whipstitching over the top of all thicknesses (Fig 9). Be sure the inside lower edge of the felt that is below the slit is flush with the lower edge of the tendinous plate of the pubococcygeus felt piece so that it covers the base of the tendinous plate completely. You will notice that the tips of the pubococcygeus piece extend beyond the edges of the puboanalis muscle: this is correct. These **pubovisceral complex attachment tabs** are used later to connect the pubovisceral complex to the pubic bone.

**Sew down the pubococcygeus fibers even if you want a model that disassembles. **

Assemble the vaginolevator attachments (parts of the pubovisceral muscle complex):

1. Cut out the paper pattern for the **vaginolevator attachments, hook & loop tape (6)**, or estimate the size and shape. Cut out two pairs of hook-and-loop pieces using pattern piece (6) as a guide. There will be four pieces in all; two hook and two loop.
2. Position one of the “hook” pieces (the bristly side) on the puboanalis muscle where indicated by the marks you transferred, and stitch into place. Whipstitch around all the edges of the hook-and-loop pieces, as if you were sewing on a patch. Do the same with the other hook piece on the opposite side of the model. Stick the loop sides of the pieces to their mates and leave them there for now, so as not to lose them (Fig. 10).

Assemble the puborectalis muscle:

1. Trace onto mesh and cut out the **puborectalis muscle, frame (7)**.
2. Cut out the paper pattern for the **puborectalis muscle, felt (8)**. Using the deep rose felt, trace or pin the pattern onto the felt and cut one felt piece. Transfer the marks for the puboperinealis attachments.
3. Lay the felt piece horizontally, wrong side up (puboperinealis marks down), and place the mesh frame along the lower edge, as in Fig. 11. Roll the mesh and felt as tightly as possible into a long, solid roll. If you can't get it started, stitch the lower edge of the felt to the lower edge of the mesh. Once it is rolled, use small whipstitches to sew the edge to the roll to hold it together (Fig. 12).

If making a detachable model, sew one side of hook and loop tape or one side of a small snap on each of the attachment marks for the puboperinealis muscle.

4. Sew this rolled piece, the puborectalis muscle, to the lower edge of the puboanalis muscle, passing around behind the cylindrical puboanalis cuff just below the ridge in back. Make sure the attachment marks for the puboperinealis muscle are on the inside (the same side

as the hook-and-loop tape for the vaginolevator attachments). An easy way to attach the roll is to first temporarily flatten the puboanalis cuff part and fold it upward, against the inside of the U-shaped part of the puboanalis muscle (Fig 13). Then hold the puborectalis roll alongside the resulting edge and whipstitch the pieces together, taking small bites on each side. Be sure to attach only the puborectalis muscle to the lower edge of the puboanalis so as not to accidentally sew the puboanalis cuff closed.

Even if you are making a detachable model, sew the puborectalis to the puboanalis muscle, as these parts are fused in life and because it is logically difficult to attach them with fasteners.

5. Following the illustration in Fig. 14a, form the entire model into a U-shape, and curve the upper edges outward, like a flared collar on a shirt. The tendinous plate of the pubococcygeus should stick straight up, out and back from the rear of the puboanalis as shown in Fig. 14b.

Assemble the puboperinealis muscle (part of the pubovisceral complex):

1. Trace onto mesh and cut out the **puboperinealis muscle, frame (9)**.
2. Cut out the paper pattern for the **puboperinealis muscle, felt (10)**. Using the aqua or turquoise felt, trace or pin the pattern onto the felt, and cut the felt piece out. There is no need to transfer the fold line.
3. Place the puboperinealis frame lengthwise over the lower half of the felt piece and fold the felt along the fold line, enclosing the frame, similar to what you did in Fig. 2. Sew the three layers together using a medium basting stitch along the edges.
4. Line up the angled ends of the puboperinealis muscle with the ends of the puborectalis muscle, making sure the angled edges are in line with those of the puboanalis muscle edges, this should result in the puboperinealis muscle forming a loop that is angled down and back, as shown in Fig. 15. Tack the tips of this strip of muscle just inside the ends of the puborectalis muscle, with the upper edge of the puboperinealis muscle in line with the bottom edge of either side of the puboanalis muscle (Fig. 15).

If you have sewn hook-and-loop tape or a small snap at the attachment marks for the puboperinealis, now sew the other side of the fastener to the ends of the puboperinealis.

Fix the size of the anourethral hiatus:

Set the size of the anourethral hiatus by placing a spacer stitch to fix the side walls of the puboanalis muscle with a 2.5 cm space between them. To do this, have a threaded needle and a ruler ready.

1. Place your nondominant thumb and index finger on the outside of the U-shaped puboanalis muscle, near the open end (Fig. 16a).
2. Use your other hand and the ruler to measure a 2.5 cm gap between the sides of the open end of the U at the level of the dots on the puboanalis muscle and adjust your grip to maintain this gap (Fig. 16b).
3. As you assess where to place the stitch, keep in mind that both the yoni and urethral canals will eventually need to be inserted between this stitch and the puboperinealis muscle (see Fig. 42). Carefully tack the two sides of the puboanalis muscle together with thread so

that you span the 2.5 cm space. Insert the needle on the outside of one side of the U at the dot you marked earlier, and exit through the dot on the opposite site, so you have 2.5 cm of thread between your entry and exit points as in Fig. 17. Pass the thread through several times like this. This holds the gap at the open end apart at an appropriate width.

Assemble the wire mesh frame for the iliococcygeal muscle:

1. Trace onto mesh and cut out the **iliococcygeal muscle, frame (11)**. Be sure to trace the V-shaped solid and dotted lines. Cut along the solid line of the V on both sides.
2. Overlap the cut solid line of the V to the dotted line, so that the dotted lines meet. Refer to the paper pattern. This will give the frame piece two slight cone-shaped areas, similar to darts in fabric (Fig. 18). Tack the overlapped section together to hold it in place. The entire structure will resemble a bat with its wings spread. The side with the points of the darts (that is, the convex side) becomes the superior side of the muscle.

Assemble the felt pieces of the iliococcygeal muscle:

1. Cut out the paper pattern for the **iliococcygeus muscle, bottom layer, felt (12)**. Using the green felt, refer to the pattern piece layout shown on the same page to ensure you have enough felt. Trace or pin the paper pattern onto the felt, and cut the piece out.
2. Bring the sides of the Vs together so that they are just touching, and whipstitch together with small stitches, creating a dart on either side (Fig. 19).
- **If you are creating a model to be disassembled, cut four one-inch pieces of hook-and-loop tape. Sew one on each dot, running the tape from the dot toward the dart (may overlap the dart), and one by each side of the gap in the back of the muscle. Put the other sides of these pieces of tape on their mates to avoid losing them.**
3. Lay the wire mesh frame piece over the felt piece with darts pointing up. Center the mesh so that the felt sticks out about 1/8" all around. Tack the mesh onto the felt using just a few stitches in the corners and in the center.
4. Fold the entire piece in half along the center fold line so that the mesh sides face each other. In the posterior center, stitch through all layers along the stitching lines, which will create a ridge (Fig. 20).
5. Fold each side down along the stitching line, creating a curved, winged piece with the darts (mesh side) pointing up and the ridge you just created along the bottom (Fig. 21).
6. Cut out the paper pattern for the **iliococcygeus muscle, upper layer, felt (13)**. Using the green felt, trace or pin the paper pattern onto the felt and cut the felt piece out. Transfer the dots and the small Xs to the side that will face up.
7. On each side of the felt piece you just cut out, bring the sides of the Vs together so that they are just touching. Whipstitch each V together, creating a dart on each "wing," like you did with the two pieces in steps 1 and 2. This piece should now resemble the mesh and felt form you finished in step 3.
8. Lay the felt for the ileococcygeus muscle, upper layer (13) over the mesh and felt form, sandwiching the mesh, darts pointing up. Baste or whipstitch around all edges and through all thicknesses.
9. Mold the iliococcygeus form to fit the curved upper U-shaped edge of the puboanalis form with the ridged part beneath the tendinous plate of the pubococcygeal muscle. Referring

to the paper pattern piece (13), align the tendinous plate with the dotted lines on top of the iliococcygeus and tack into place through all layers as in Fig. 22.

- **If you want to be able to detach the parts later, put a fastener at the two front inner corners (snaps work well here). Sew the other half of the hook-and-loop tape on the bottom of the tendinous plate to the upper surface of the iliococcygeus, at the middle of the gap.**
- 10. Mold the upper edge of the puboanalis muscle into a gentle curve that will overlap the edge of the iliococcygeus muscle. Gently cup the sides of the iliococcygeal muscle up and out so that they act as an extension of the flared edges of the puboanalis muscle, like a wide shirt collar (Fig. 23).
- 11. Make sure the edges of the puboanalis part overlie the anterior edges of the iliococcygeal muscle at the Xs. Tack them together at this point, either using a stitch through all layers at the X, or a whipstitch over the edge of the puboanalis muscle, as shown in Fig. 24.
- **If making a detachable model, sew the other half of the fasteners that you sewed to the front, inner corners of the iliococcygeus to the puboanalis, just under the pubococcygeus fibers.**

Assemble the coccygeus muscles:

1. Trace onto mesh and cut out the **coccygeus muscle, frame (14)**. Make two pieces.
 2. Cut out the paper pattern for the **coccygeus muscle, felt (15)**. Using the light yellow felt, trace or pin the pattern onto the felt, and cut out two felt pieces. Flip the paper pattern piece over and cut out two more pieces, so that you wind up with two pairs of mirror-image pieces.
 3. Sandwich one piece of mesh between one pair of felt pieces and tack together through all thicknesses with basting or whipstitches (Fig. 25). Repeat for the other side of the muscle. Lay the finished pieces in front of you as shown in Fig. 25 and mark the dots as shown. Set both completed pieces aside for now.
- **If you are attaching the muscles together with fasteners, remove the matching pieces of hook-and-loop tape from the dot ends of the iliococcygeus muscle and sew these onto the top felt layer of the coccygeus muscles. Two of them should go on the dot ends, with most of the tape hanging below the lower edge of the coccygeus muscle. The other two should go on the opposite end of the same edge, but entirely on the piece of felt. Cut two more one-inch pieces of hook-and-loop tape. Place one side of the tape along the inside short edge of each coccygeus muscle, and trim the edge of the tape so that it follows the curved edge. Sew the tapes to the undersides of the muscles, and place their mates on them. The mates will later be sewn to the back of the sacrum.**

Assemble the sacrum and coccyx:

1. Trace onto mesh and cut out the **sacrum and coccyx, front, frame (16)** and the **sacrum and coccyx, back, frame (17)**.
2. Cut out the paper pattern for the **sacrum and coccyx, front, felt (18)**, and the **sacrum and coccyx, back, felt (19)**. Using the white felt, trace or pin the paper patterns onto the felt, and cut out both felt pieces. Transfer the dots to the wrong (inside) sides of the felt pieces. If you wish, transfer the details of the sacral anatomy onto the right (outside) side of the felt piece 18.

3. Lay the sacrum-coccyx front mesh (16) on the wrong side of the sacrum-coccyx front felt (18), and tack into place around the edges.
4. Lay the sacrum-coccyx back mesh (17) on the wrong side of the sacrum-coccyx back felt (19), and tack into place around the edges.
5. Lay the sacrum/coccyx back on top of the sacrum/coccyx front, mesh sides facing each other, matching the coccyx and dots (Fig. 26). Sew the pieces together from dot to dot along the stitching lines, with short basting or whipstitches.
If making a detachable model, sew the other side of the tendinous plate's snap onto the tip of the inside surface of the coccyx, being sure that it fits correctly into the gap in the iliococcygeus muscle.
6. Take the two unsewn mates on the coccygeus muscle and sew these along the edge of the sacrum and coccyx so that they correctly match the hook-and-loop tape on the inside edge of the coccygeus muscles. Most of the tape will stick out past the edge of the sacrum-coccyx back.**
7. Cut out the paper pattern for the **sacrum side, felt (20)**. Using the white felt, trace or pin the paper pattern onto the felt and cut out a felt piece. Flip the paper pattern and repeat so you have two sacrum side pieces.
8. Curl the sacrum-coccyx form slightly into a parenthesis shape, with the shorter sacrum-coccyx front piece on the inside of the curve (Fig. 27). Now spread the front and back apart (Fig. 28). You will notice that this creates a curved V-shaped space between the two sides. This is where you will be attaching the sacrum side pieces. Get the left sacrum side piece positioned as shown in Fig. 29, and use a whipstitch over the edges to sew each side into place. Start at the point of the V and sew one side, then the other.
9. If you wish, now is the time to add a little fluffy pillow stuffing inside the sacrum to help it hold its shape. Be sure to do this carefully so as not to distort the shape.

Attach the posterior levator ani muscle complex edges to the sacrum and coccyx:

- **If you are making a model that disassembles, at this point you should be able to match the various hook-and-loop tape pairs and the snap to connect the posterior region of the levator ani muscle complex to the sacrum and coccyx.**
1. With the concave curve of the sacrum toward the pelvic cavity, fit the tip of the coccyx into the V-shaped cut-out in the back edge of the green iliococcygeus muscle. Make sure the light blue tip of the tendinous plate of the pubococcygeus is on the top, as shown in Fig. 30. Tack the layers and edges together securely.
 2. Refer to Fig. 31 to fit one half of the coccygeus muscles along the inside (pelvic) edge of the sacrum and coccyx. The lower edge of the coccygeus muscle should be level with the tip of the coccyx on the underside. Tack the scalloped edge to the sacrum-coccyx.
 3. After both muscles are tacked to the bones, align (do not overlap) the dot at the narrow end of one coccygeus muscle with the dot on the iliococcygeus muscle. Using a whipstitch tack these muscles together at the dots (Fig. 32). The resulting V-shaped area created by the edges represents where the muscles would attach to the ischial spines on either side. Now your model should look like Fig. 33.

Assemble the section of the yoni canal:

NOTE: This model depicts only the portion of the yoni and urethral canals that span approximately from the distal mid-third to the distal upper third of the yoni. There is a little more of the lowermost end of both canals that project beyond the anterior edge of the yoni model to the introitus externally.

1. Trace onto mesh and cut out the **yoni canal, frame (21)**.
2. Cut out the paper pattern for the **yoni canal, felt (22)**. Using the pink felt, trace or pin the pattern onto the felt, and cut out one piece.
3. Lay the frame piece lengthwise in the center of the felt piece. Fold the sides of the felt piece toward the center so that they touch (but do not overlap), and sew the edges together using a whipstitch (Fig. 34).
4. Form the piece into a circle with the stitches on the inside. The edges of the circle should meet but not overlap. Sew the edges together with a whipstitch, using large, closely spaced stitches (Fig. 35).
5. Cut out the paper pattern for the **urethral canal attachment, hook & loop tape (23)**. Trace onto the hook-and-loop tape (or estimate the size and shape) and cut out. Sew the loop half of the hook-and-loop tape lengthwise to the top center of the yoni canal, over the stitches that close the circle, as shown in Fig. 36. Attach the remaining hook piece of the tape so as not to lose it.
6. Referring to Fig. 37, form the canal into a rectangle with the top and bottom about 3.5 cm wide. Now push in the sides of the tube to form four corners, creating the H-shape of the yoni canal at this level. Lay the canal on its side, then bend in the sides toward the center and flatten (Fig. 38).
7. Remove the loop pieces from the vaginolevator attachments you sewed onto the puboanalis muscle earlier, and sew these lengthwise along the upper, outer corners of the H at one end of the yoni canal on either side. The top edge of the tape should align with the dots shown on your left in Fig. 38 (the tape is attached along the sides of the top fold so you cannot see where this is on the other side in this oblique view). Affix the yoni canal into your model, by fastening the hook-and-loop tapes on either side, with the yoni inserted under the string spacer and resting on the puboperinealis muscle (Fig. 39). The yoni canal should be at a steep angle, which is best seen from overhead as shown in Fig. 48.

Assemble the section of the urethral canal:

1. Cut out the paper pattern for the **urethral canal, felt (24)**. Using the gold felt, trace or pin the paper pattern onto the felt and cut out one felt piece. Referring to the paper pattern, roll the felt tightly, starting with one short side. Use small whipstitches to sew the edge to the roll to hold it together (Fig. 40).
2. Remove the hook piece from the top of the yoni canal and sew it to the urethral canal lengthwise, over the previous stitching (Fig. 41).
3. Attach the urethral canal to the loop tab on the top of the yoni canal, tucking it under the spacer stitches (Fig. 42).

Make the Styrofoam pelvis:

NOTE: This model consists of only the pelvic brim, a pubic arch and a sacrum to allow you to better view the pelvic floor. If you are disoriented by the omission of the sides of the pelvis, please refer to the review of the bony pelvis that begins on page 31. If you are still confused, examine a complete 3-D female pelvic model, which every midwifery school should have on hand.

1. Cut out the paper pattern for the **pelvic brim (25)**. Please note that although the shaded areas are part of the pattern, they are merely to assist with alignment. DO NOT cut these shaded areas from the Styrofoam.
2. Use straight pins to attach the paper pattern to the Styrofoam round, positioning it so that both the shaded curve and the unshaded curve at the anterior edge follow the curved edge of the Styrofoam. Make sure that the pattern is centered from side-to-side as well, as shown in Fig. 43. Styrofoam discs are not perfectly circular, so move the pattern around the edge until you find a position that works. If the edges of the pattern do not meet both edges of the disc (that is, if the disc is larger than 8"), align the anterior shaded area along the edge and cut the **notch for the sacrum back** as deeply as the pattern will then indicate.
3. Transfer the dot in the center of the shaded area of the anterior edge to the "front" edge of the Styrofoam (on the 1" side), and place another dot above it on the top (flat surface) of the round, as shown in Fig. 44. Transfer the leveling indicator dot as well by marking it just outside the edge of the brim line.
3. Trace the two white bold-lined areas onto the Styrofoam with your marker, the **notch for the sacrum back** and the outline of the **pelvic brim**. Remove the paper pattern and use the razor knife to carve out the traced pattern all the way through the foam. Point the blade straight down and use a sawing motion to keep the walls of the cutout as straight as possible (Fig. 45). Try not to cut off the leveling indicator dot completely; make a new mark on the Styrofoam to replace it if you do. Gently remove the cut out pieces.

Attach the felt model to the back side of the Styrofoam pelvis:

1. Referring to Fig. 46, align the top edge of the felt/mesh sacrum back with the top outside edge of the notch in the sacral region of the Styrofoam pelvis. Attach it with straight pins pushed straight into the Styrofoam.
2. Align the felt/mesh sacrum front with the inside back edge of the pelvic brim and center it in place. Secure with straight pins (Fig. 47).

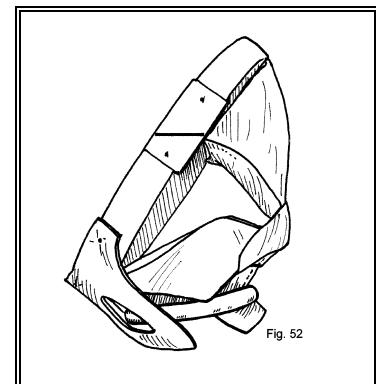
Assemble pubic bone and attach felt model to the anterior of the Styrofoam pelvis:

1. Trace onto mesh and cut out the **pubic bone, frame (26)**. To avoid distorting the mesh, cut along the solid line to reach and cut out the obturator foramina. Stitch the slit you created to reach the obturator foramina closed with small whip stitches. You can make this piece out of stiff but thin cardboard (posterboard will work well or a manila file folder) instead, if you want the pubic bone to retain its shape better.
2. Cut out the paper pattern for the **pubic bone, felt (27)**. Using the white or cream felt, trace or pin the pattern onto the felt and cut out a felt piece. Repeat so you have two felt

- pieces. Transfer the “centering” dot to the outside surface of one felt piece.
3. Sandwich the mesh (or cardboard) between the two felt pieces and tack them together through all thicknesses with a couple of large basting stitches to hold the pieces together. Then sew around the edges with basting or whip stitches. Be sure to stitch around the obturator foramen holes as well. Once the edges are sewn, remove the tacking stitches. Set the pubic bone aside.
 4. Using straight pins, attach the pubic bone to the front of the Styrofoam pelvis, lining up the center dots (Figs. 48 and 49). The top edge of the felt piece should be flush with the top edge of the foam (Fig. 49). Insert the pins at a sharp angle, so they do not stick out the other side.
 5. Position the anterior portion of the puboanalis muscle so that it is centered to either side of the dot (Figs. 48 and 49). The urethra should be visible under the pubic arch from the front of the model (there can be a little gap between the bone and the urethra, but the puborectalis muscle should not be visible past the lower edge of the bone). Push the puboperinealis muscle back so that it is well underneath and slightly posterior to the front edge of the yoni. Hold the muscle complex in place.
 6. Position the pubovisceral complex attachment tabs flat against the Styrofoam and insert pins through them at a sharp angle (so they don’t stick through the other side) to attach the pubovisceral complex to the pubic bone. (The iliococcygeus will extend down, around and past the brim on either side.) Once the pubovisceral complex is in place, you can trim out the spacer stitches if you wish, although it is better to leave these in place.
 7. Reshape the muscle parts as necessary to make sure that the top edge of the puboanalis muscle is uniformly flared, the inside edge of the iliococcygeus muscle is under (inferior to) the flared edges of the puboanalis muscle, and the sides of the iliococcygeus muscle are uniformly cupped upward (Fig. 50).
 8. Bend the puboanalis cuff back so that it is angled toward the sacrum. You can tack it to the puborectalis muscle to keep it in place, if you wish, as it tends to bend out of position, even with the frame.

Attach the leveling indicator

1. The model is complete. To see how it looks in a woman who is standing, however, you will need a reference point. Cut out the **leveling indicator (28)**.
2. Starting at the leveling indicator dot you made at the “corner” of the pelvic brim, measure 5.5cm at an angle to the edge of the foam. Mark or place a locator pin at this spot on the edge of the foam (Fig. 51).
3. Pin the leveling indicator to the foam with the “top” of the leveling line meeting the mark or locator pin (remove the pin) (Fig. 52). When you hold the model up at eye level and position it so that the leveling line is horizontal, the pelvic brim is at a 58° angle, the average angle of the brim when a woman is standing (the range is typically 55 to 60°).



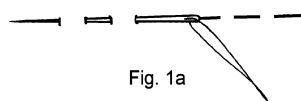


Fig. 1a

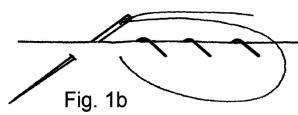


Fig. 1b

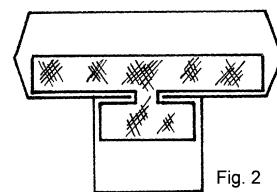


Fig. 2

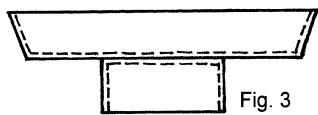


Fig. 3

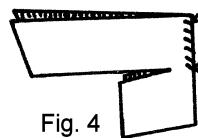


Fig. 4

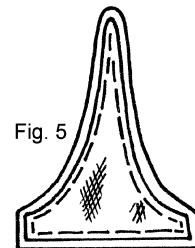


Fig. 5

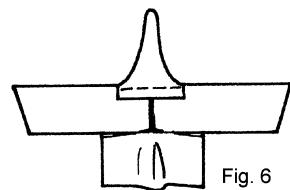


Fig. 6

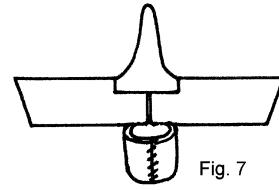


Fig. 7

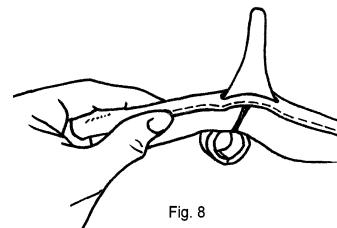


Fig. 8

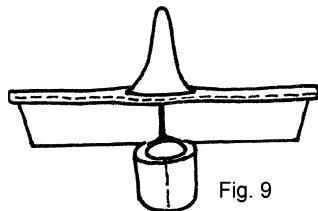


Fig. 9

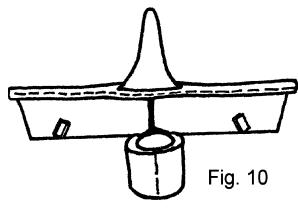


Fig. 10

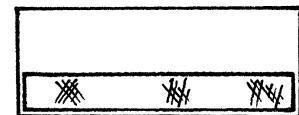


Fig. 11

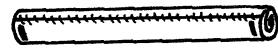


Fig. 12

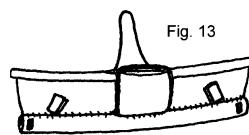


Fig. 13

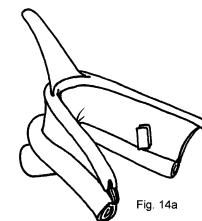


Fig. 14a

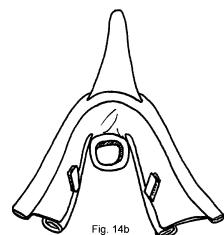


Fig. 14b



Fig. 15

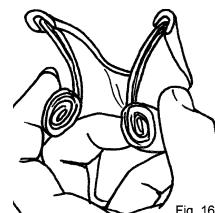


Fig. 16a

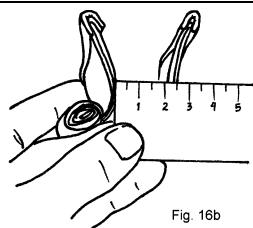


Fig. 16b

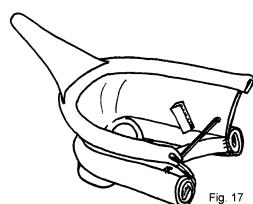


Fig. 17

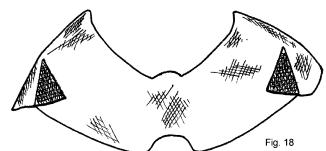


Fig. 18

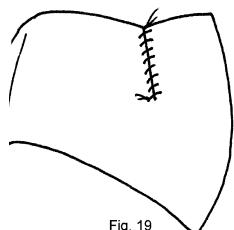


Fig. 19

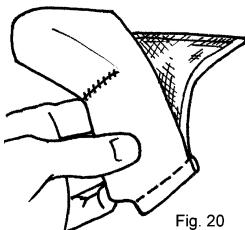


Fig. 20

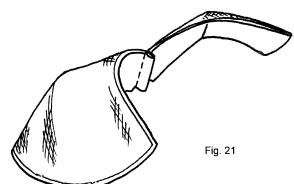


Fig. 21

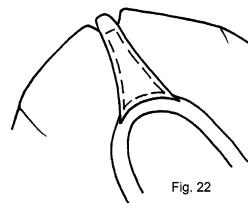


Fig. 22

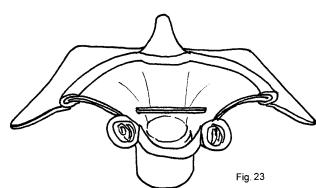


Fig. 23

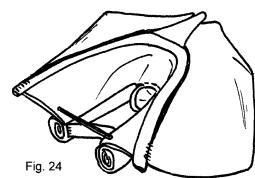


Fig. 24

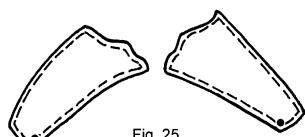


Fig. 25

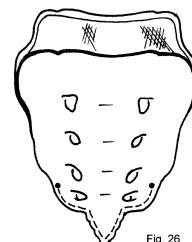


Fig. 26

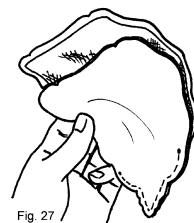


Fig. 27

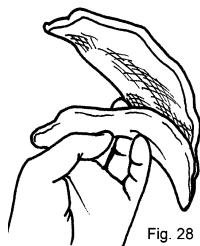


Fig. 28

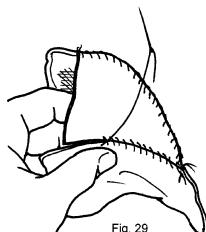


Fig. 29

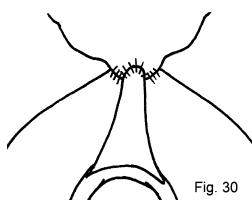


Fig. 30

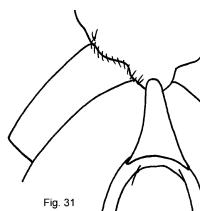


Fig. 31

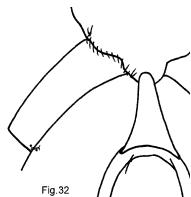


Fig. 32

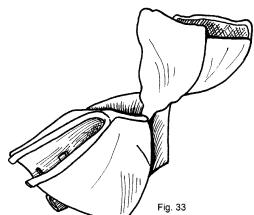


Fig. 33



Fig. 34

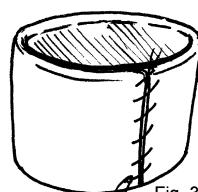


Fig. 35

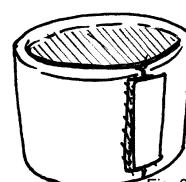


Fig. 36

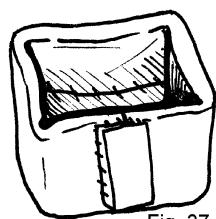


Fig. 37



Fig. 38

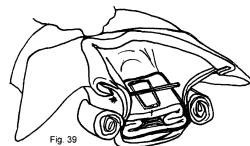


Fig. 39

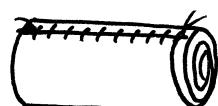


Fig. 40

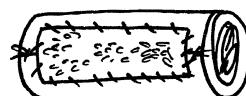


Fig. 41



Fig. 42

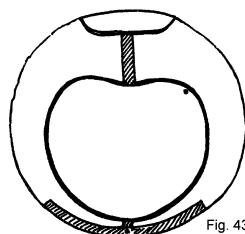


Fig. 43

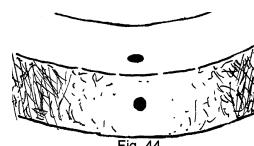


Fig. 44

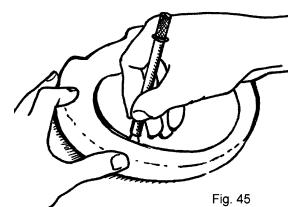


Fig. 45



Fig. 46

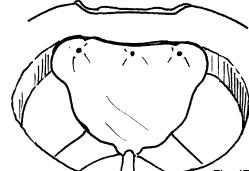


Fig. 47

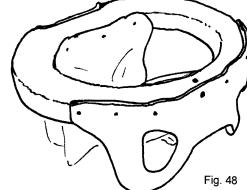


Fig. 48

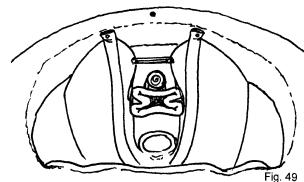


Fig. 49

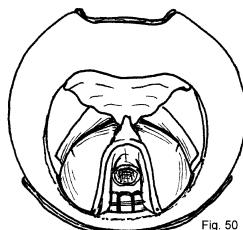


Fig. 50

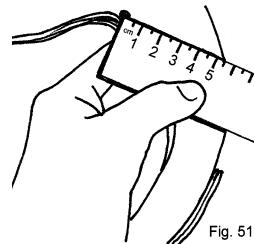
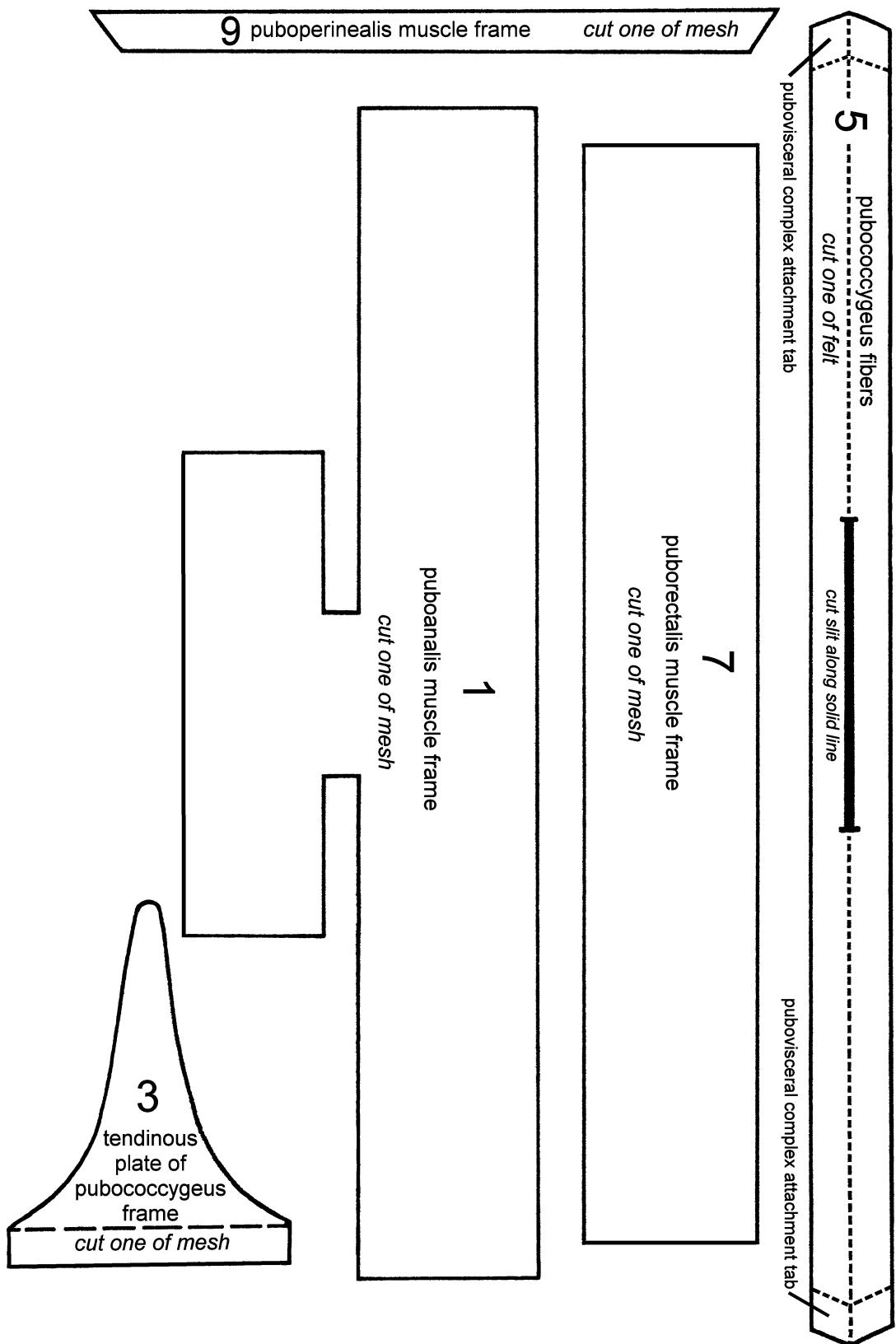


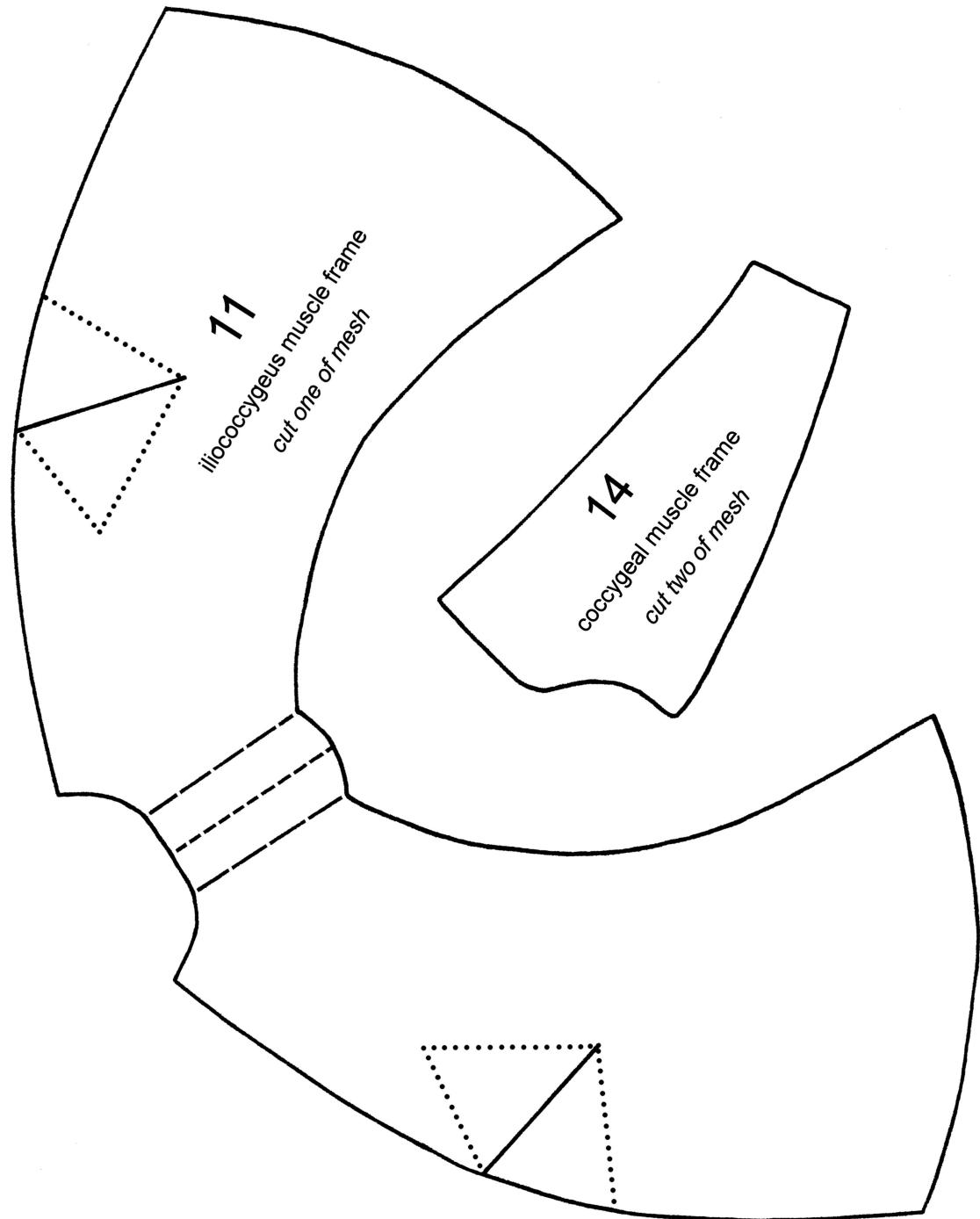
Fig. 51

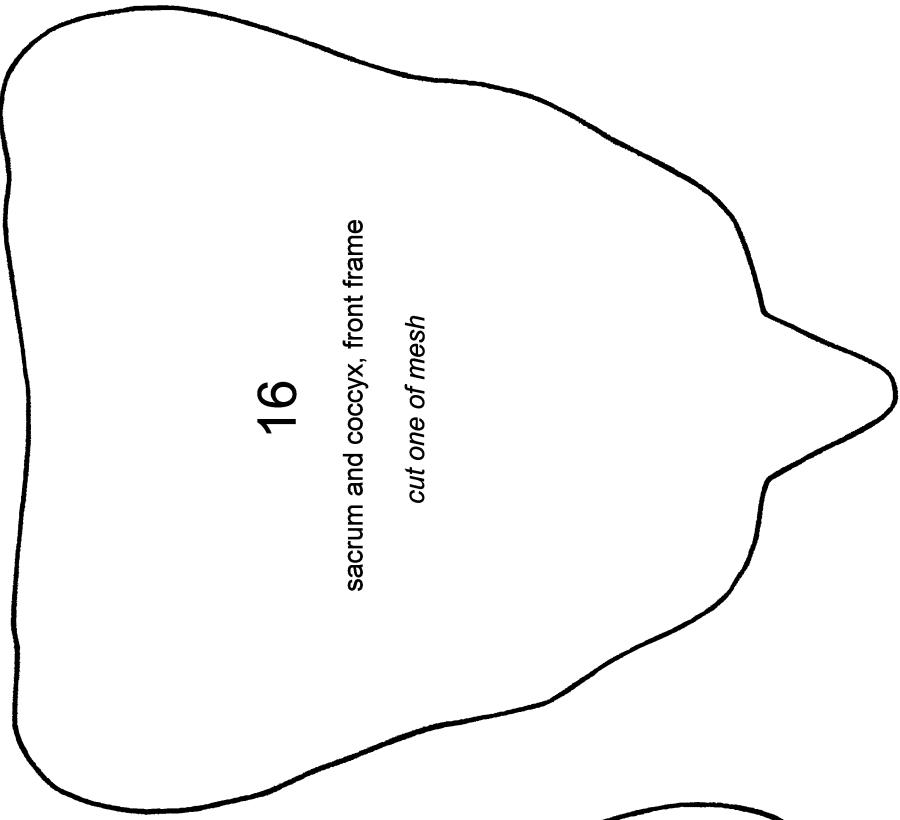


21

yoni canal frame

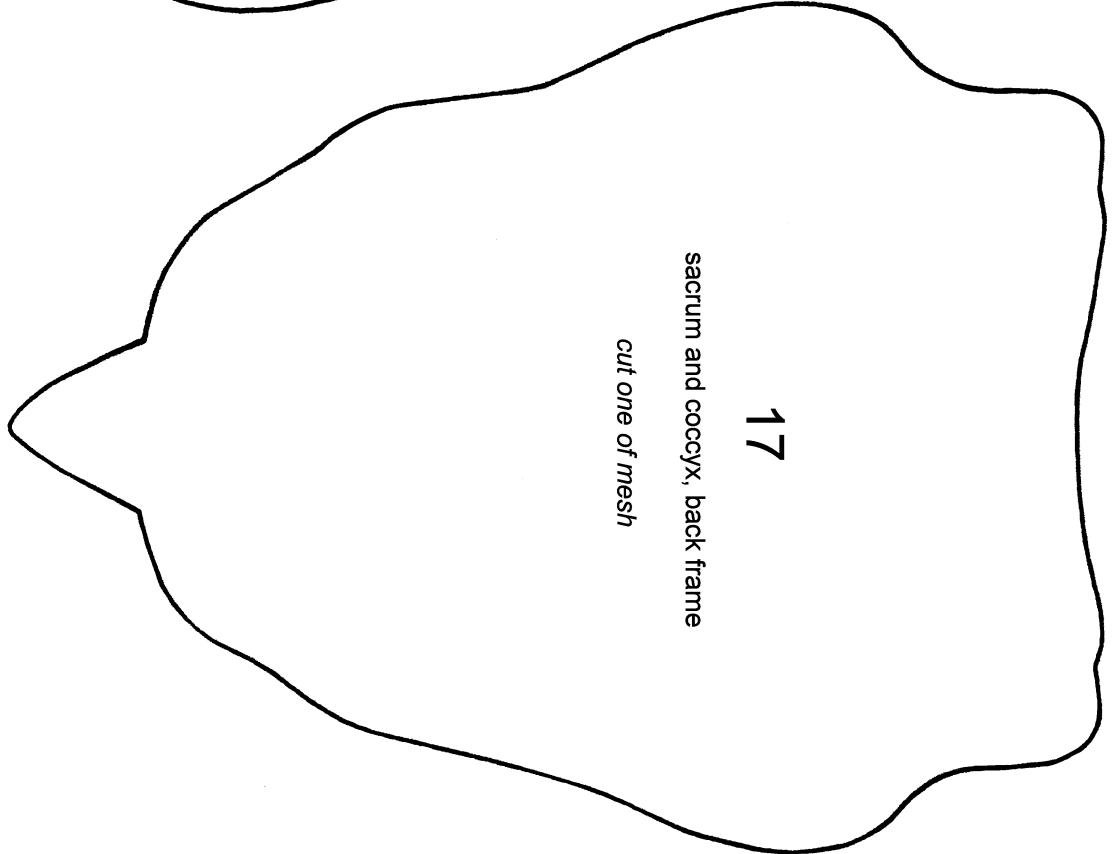
cut one of mesh





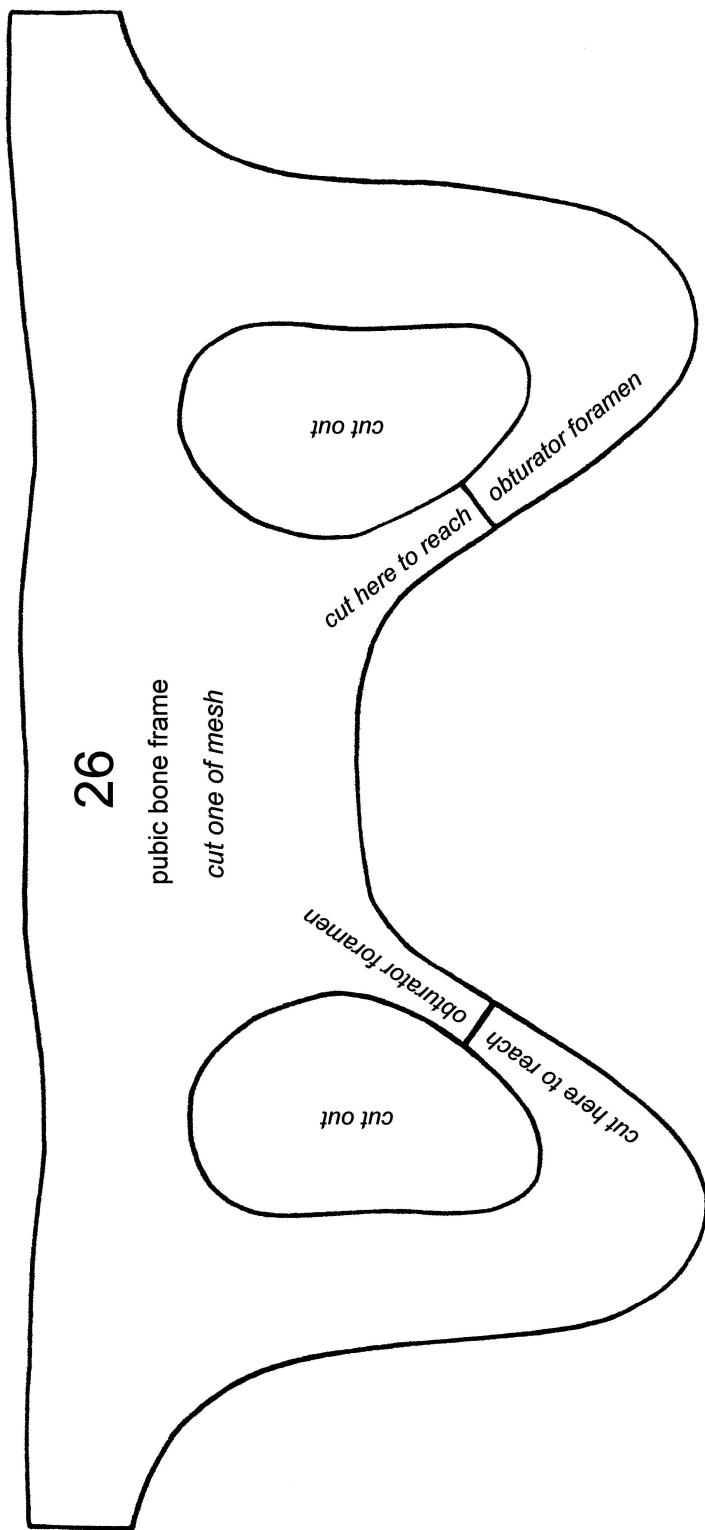
16

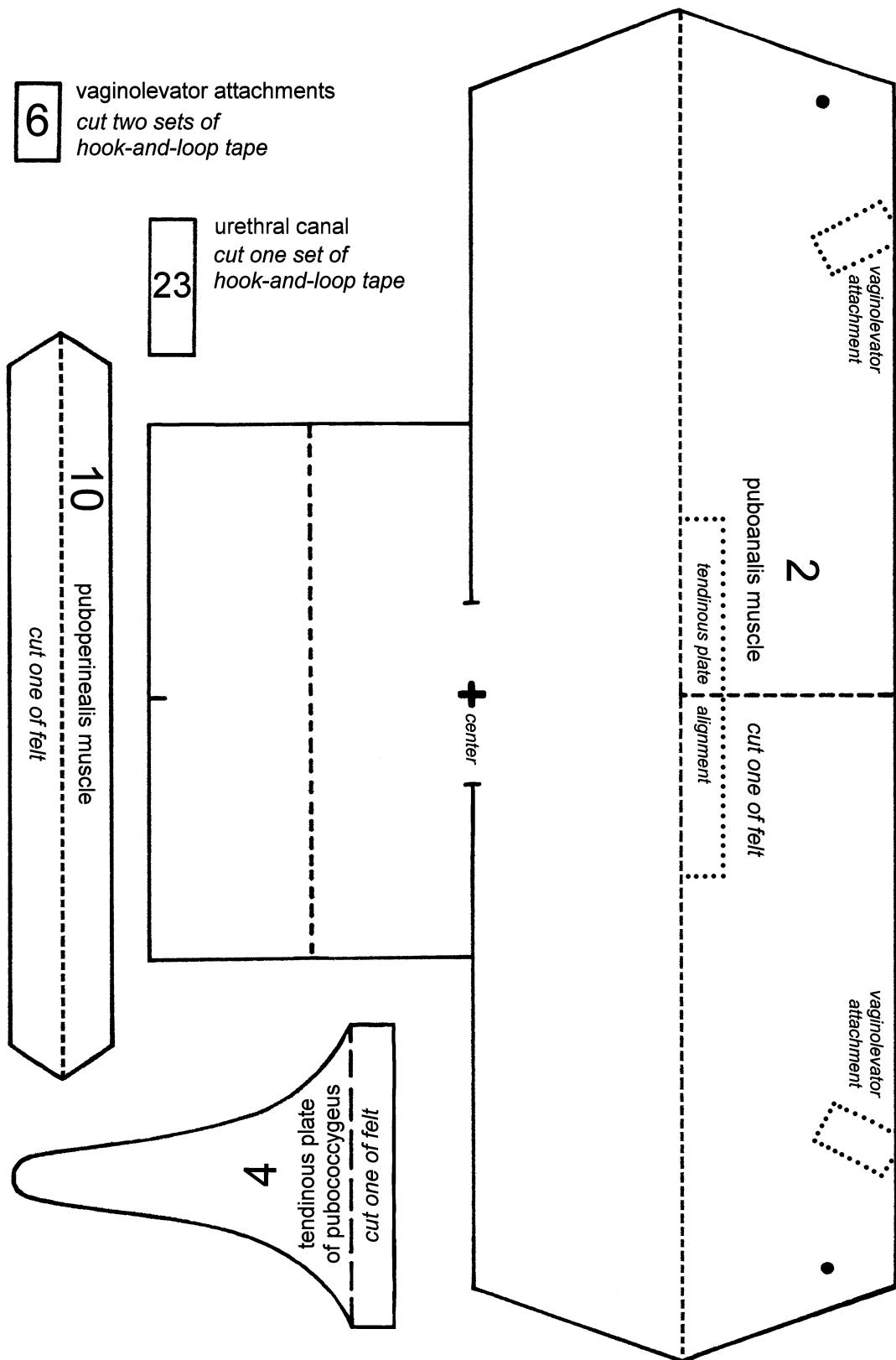
sacrum and coccyx, front frame
cut one of mesh



17

sacrum and coccyx, back frame
cut one of mesh





I
puboperinealis
attachment

8

puborectalis muscle

cut one of felt

puborectalis muscle frame alignment

↑
roll tightly in this direction
↑

yoni canal frame alignment

22

yoni canal

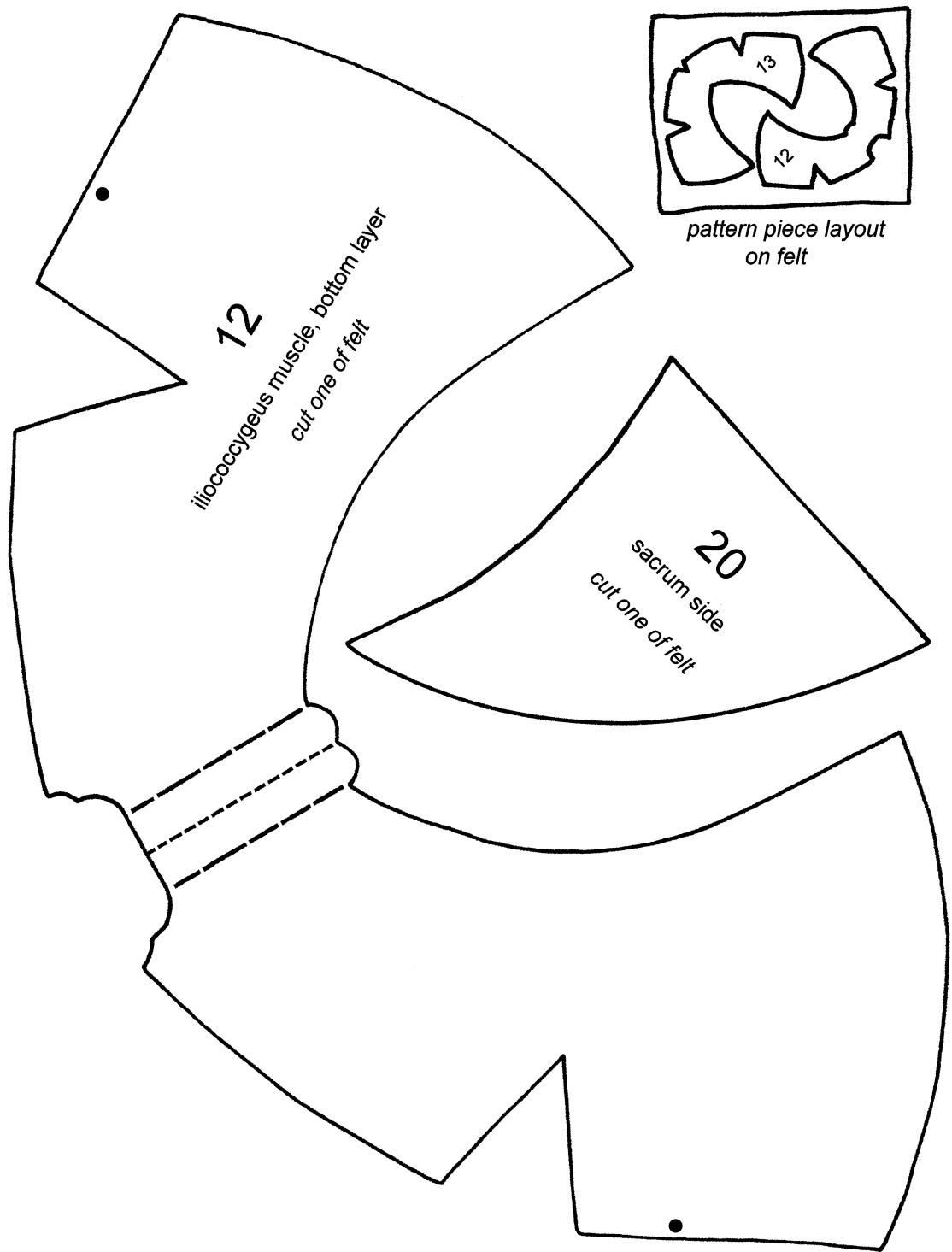
cut one of felt

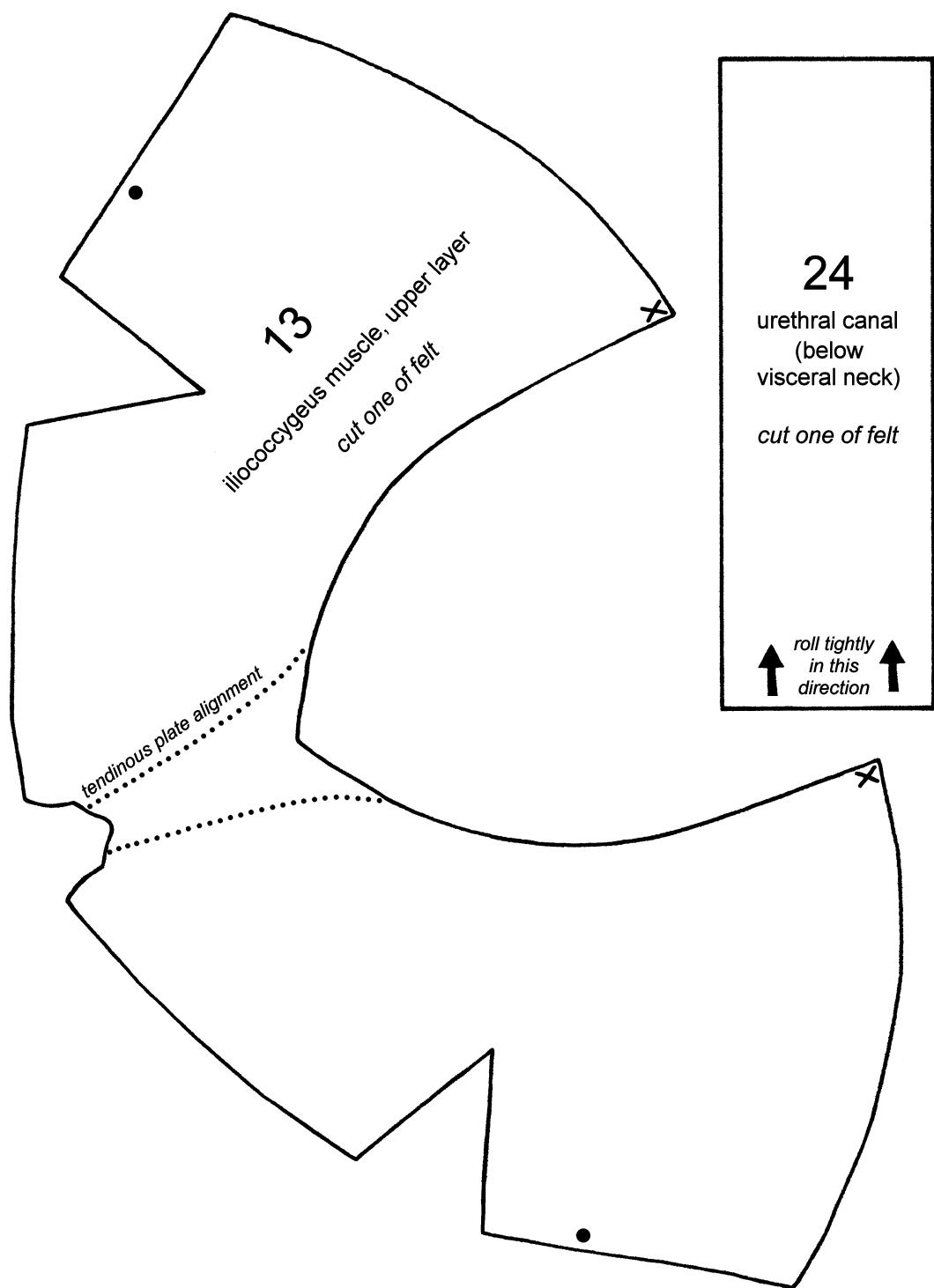
I
puboperinealis
attachment

15

coccygeus muscle

cut four of felt





645

18

sacrum and coccyx, front

cut one of felt

19

sacrum and coccyx, back
cut one of felt

