BODY ALIGNMENT - LESSON 1 Weight, sitz-bones, femur bones, alignment from head of femur bone to floor

Introduction - The sensation of movement as a whole, not that of individual muscles, is what we are accustomed to feeling. In this technique of understanding and making corrections in body alignment, we use kinesthesia to balance and coordinate body parts. Images help to trigger individual muscles.

Part of our work has to do with correcting preconceived notions about good alignment - for awhile it will be clumsy - that is, it may seem more efficient to work with old patterns than with new ones, - but the new understanding may save wear and tear on our bodies in the long run.

(From Mabel Elsworth Todd, p. 33 - "The ability to improve a pattern of support and movement for the reduction of mechanical stresses comes, not through the development of bulk and power in individual muscles, but from the study and appreciation of the human body as a weight-bearing and weight-moving structure. Kinesthesia, the feeling of movement and of weight, is the important source of our information. Through it we are able to bring about a better balancing of parts, and thus coordination of the whole."

Exteroceptive-perception of outer world.

Proprioceptive sensations, also called "organic" are grouped according to their origins in various parts of the organism, into three general types: the "feeling of movement," in all skeletal and muscular structures, called kinasthesai; the feeling of position in space, derived from organs in the inner ear and known as labyrinthine; and miscellaneous impressions from various internal organs, as of digestion and excretion, called visceral.

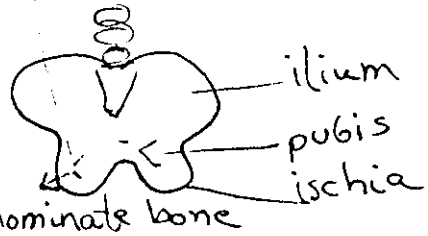
Muscle tone is a steady slight contraction of muscles, ligaments and fascia - may be quite independent of surface sensibility. The more observable is tissue tone. Muscle tone may depend on relay system of contraction of muscle fibres. - Tonus.

Form follows function - The skeletal formation first protects heart and respiratory system, then allows for movement. The spine is the fundamental basis of support and movement for all the various vertebrae structures. The strenght of arms and legs depends upon their closeness of association with the strongest parts of the spine; therefore the great muscles binding the pelvis and legs to the spine extend deep into the trunk. Strenght of movement of the arms, in throwing, grasping, lifting, is dpendent upon the underlying support and strenght of loins and thighs. The essential structures for the support of body-weight and for the control of movement are thus to be looked for in the lower spine.

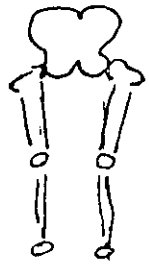
Find sitz-bones (use hands) - feel body weight resting on sitz-bones on chair.
(Body weight transferred to ischia to heads of femora through acetabulum.)
Note pelvis supports rib cage supports head so that weight accumulates downward. (A)

(Also: Reps - "Siton column open at both ends."

Note then that there is a counter-thrust upward (B)



Innominate bone



Exercise: Sit on sitz-bone - let weight rest on chair.
Rock from one bone to other (left 2x, right 2x, left 2x)
Walk forwards and backwards
Let weight rest on alternating sitz-bones in image only.

Feel counter-thrust upward to support head -

Note: standing alignment is from head of femur bone (femur on slant) through knee-caps through arches of feet to floor.
Weight now is distributed to floor through head of femur bones.

Exercise: Feel weight resting on top of femur bones.

Femur bance

Note: Greater trochanter doesn't take weight. Release greater trochanter.

Exercise: With partner, let greater trochanter droop to floor as partner finds greater trochanter and traces fingers down outside of leg.

Exercise: Walk sensing weight on femur bones; hop; jump, run.

Constructive rest position: Lie on floor with legs over chair (or with knees bent, feet resting on floor, knees tilted towrd each other). Lie on blanket with small pillow under head perhaps.

Exercise: Sense: Baggy coat - palms of hands behind shoulder blades smoothing wrinkles.

Mandarin collar about throat to balance muscles in front and back of neck.

Baggy pants to release leg juscles - to allow counter thrust of femur bone into sockets.

(Find head of femur bone with finger stretch.)

Lower legs to floor tracing counter-thrust with fingers.

Roll to left, right, left. Rise.

BODY ALIGNMENT - LESSON I Exercises

I Sitting Image* WEIGHT ON SITZ-BONES

A Let weight rest through sitz-bones
B Rock to one bone, releasing other (left 2 times, right 2 x, left 2 x)
C "Walk" forward and backward on sitz-bones
D Let weight rest on one bone then the other in IMAGE ONLY

II Standing WEIGHT ON FEMUR (THIGH) BONES

A Femur bounce
B Release tension from greater trochanter and sitz-bones
C Trace slanting alignment from thigh to arch
D Walk
E Hop
F Run
G Jump

III Constructive Rest Position

A Baggy suit coat
B Mandarin collar
C Baggy pants
D Rest in this posture, relaxing femur bones into sockets
E Both hands on both knees, draw left knee to chest, then right knee to chest. Lower legs to floor; rotate in hip sockets.
F Rest feet on floor, knees tilting in
G Roll to left, right, left.

Assignment: TRACE PELVIC GIRDLE IN THREE POSITIONS.
DRAW ALIGNMENT LINE FROM HEAD OF FEMUR BONE TO ARCH OF FOOT.

Body Alignment - Lesson 2 - Sacrum as keystone, spinous processes merging into tail bone, counter-thrust of femur bone, Pelvic balloon

Review Lesson 1. (Weight on sitz-bones, counter-thrust upward to support head, femur bone - greater trochanter droop, leg alignment) (tensile and compression forces)

Understanding function of sacrum as keystone. ("The bridge that walks, and the bridge that you walk over." p. 117 in Todd)

When the pelvis is in balance, the forces acting through the arches (of ischio-ilio-sacral when sitting, femoro-ilio-sacral when standing) should relate in the same manner to the sacral keystone whether sitting or standing. The downward force (gravity) is met by an equal counter-force (counter-thrust) to hold the keystone in place. The muscles in the hip joint attach to the torso to help hold the keystone in place so the the weight can travel "up and down" in balance.

Force downward - compression.
Force upward - tensile. Consider that the bones distribute the weight downward and the muscles- at the front of the body) "distribute" the force upward. Suspension bridge idea

"The femora act as added buttresses to the ilia, which in turn buttress the keystone of the arch...These lines are oblique lines of upward force, coming through the shafts of the femora from the ground and redirected toward the keystone by tensile forces - muscles and ligaments. They meet and balance the downward compression force, or weight, coming through the joints of the spine and pelvis. ...With balanced contacts at these joints securing even tonicity of ligaments and muscles about them, the lines of force will counter each other through the sacrolumbar and sacroiliac joints. If the muscles and ligaments are stretched unevenly and the timing system controlling their antagonistic action is disturbed, the weight is received by unprepared structures. ... The bracing power of the shafts of the femora is lost if the thrusts of the heads are too far forward, as for example when the legs are turned about their long axes in the "toe-ing-out" position. " This results in weight strains upon sacroiliac ligaments (lower back pain) and reduction of rotary freedon and action in thigh joint Todd - p. 117.

Understanding SPINE.
(See drawing page.)

Alternation of bony bodies of vertebrae with intervertebral discs of fibro-cartilage (1/4 length of entire spine) Each disc has central core of yellowish pulp containg fluid so strongly compressed as to make a resistant ball with t e more yielding fibers - keeps vertebrae from pressing against each other.

Make-up of spine -
7 cervical
12 thoracic
5 lumbar
5 sacral - fused
4-5 coccyx

lateral and dorsal spinous proccesses
inctavo
(Thoracic, sacral) and 3-6 mos cervical curves develop first (rib cage)
Lumbar curve is to balance out spine curves - weakest area in support of weight in order to have mobility.
6-12 mos.
When on all fours, weight was distributed equally on four points so less pressure at sacral area.

SPINAL ANATOMY

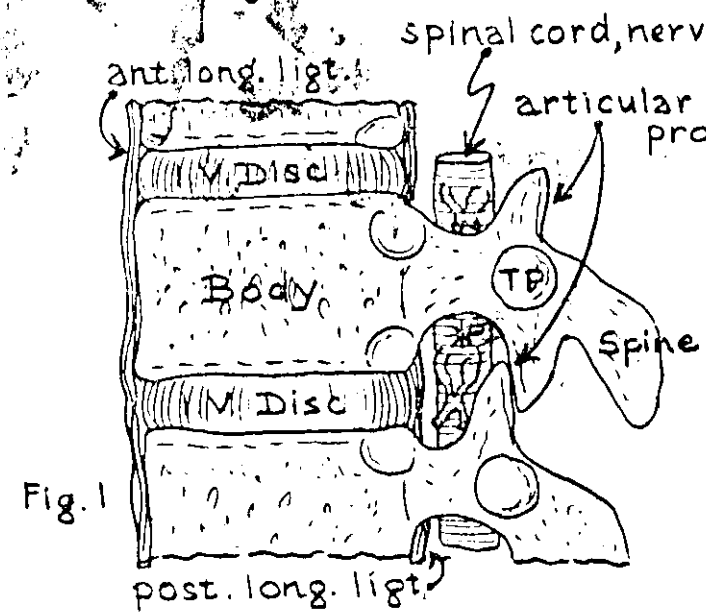


Fig. 1

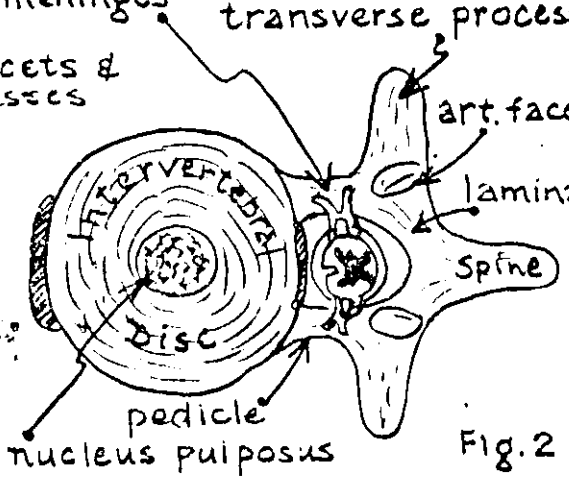


Fig. 2

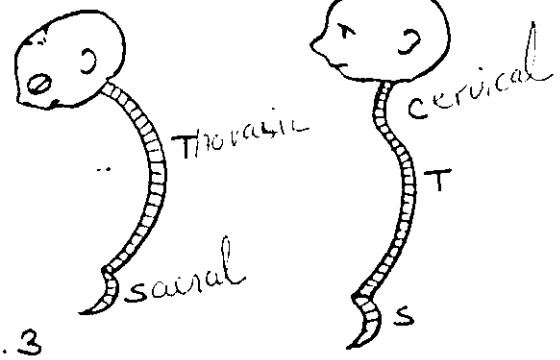
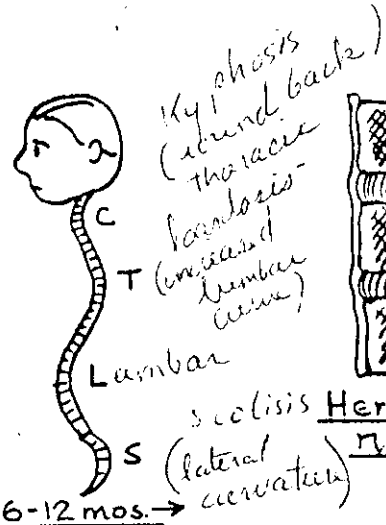


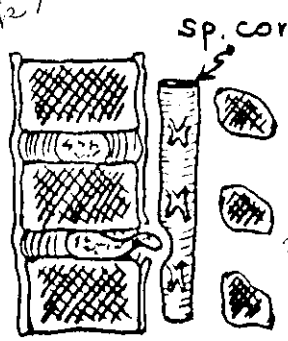
Fig. 3

In utero

3 - 6 mos.



6-12 mos.



Herniation of nucleus pulposus

Fig. 4

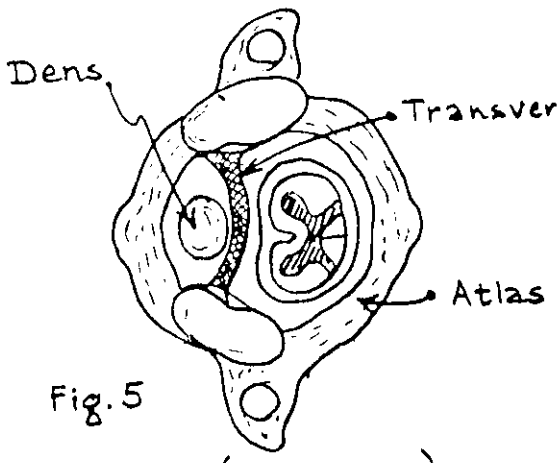


Fig. 5

Atlas (from above)

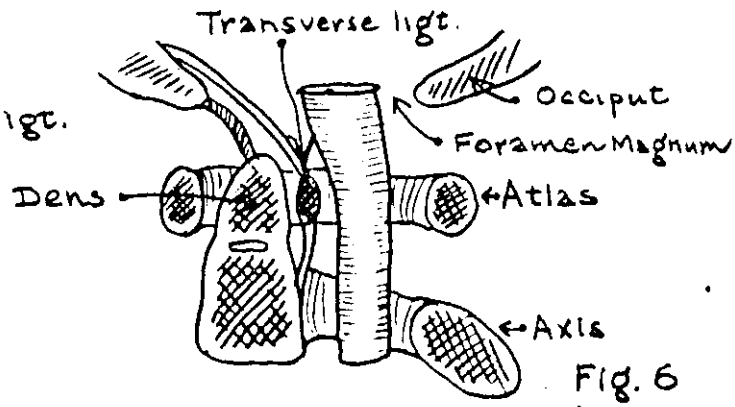


Fig. 6

Atlas & Axis (vert. section)

9.J.Th.'60

* Intervertebral foramen

BODY ALIGNMENT - LESSON II - Exercises

I Sitting - Image - TAIL , Sacrum = keystone

A Weight on sitz-bones
B Lift sitz-bones - 2 left, 2 right, 2 left
C Walk on sitz-bones

II Sitting - SPINOUS PROCESSES MERGING INTO TAIL

A - C Repeat above

III Sitting - COUNTER-THRUST OF THIGH BONE INTO SOCKET

A Slide fingertips from knee to thigh socket - left and right sides
B Imagine the counter-thrust as above while lifting each foot from floor
C Walk forward on sitz-bones, change to standing, reverse - several times

IV Standing - LET GREATER TROCHANTERS DROOP

A Stand with weight on femur bones
B Femur bounce

V Standing - TAIL IMAGE

A Femur bounce - both legs simultaneously; alternating legs
B Plie
C Walking
D Small run
E Small jump

VI Standing - SPINOUS PROCESSES MERGINING INTO TAIL

A - E Repeat above

VII Standing - COUNTER-THRUST OF "FLOOR" INTO THIGH SOCKETS

A - E Repeat above

VIII Constructive Rest Position

A Baggy coat, mandarin collar, baggy pants
B Pelvic balloon
C Tail image
D Spinous-processes-merging-into-tail image
E Combine flexion (drawing back leg into socket) with A - D
F "Sliding hands"
G Roll with image of counter-thrust
H Rise with image of spinous processes merging into tail and counterthrust

Body alignment - Lesson 2 continued.

✗ With partner, locate spine front and back and side to side. Deep within body although dorsal spinal proccesses are misleading.

✗ With partner, trace spinous processes downward to tail bone. Think down the back.

When standing, understand the pelvis and shock absorber- the distance between little trochanter and sacrum is leverage distance.
Femur bounce, little jumps.

Walk with spinous-proccesses merging into tail-bone, run, hop, etc.

Constructive rest position.

Review, baggy coat, mandarin collar and baggy pants.

Rest with sense ot spinous processes merging into tail.

Pelvic balloon - Allow stillness of rib cage. Soften nostrils, let air flow in. Let long column of air flow through nostrils and down body into pelvis, to cause pelvic balloon to expand as round. Combine inhalation with spinous proccesses merging into tail bone.

When drawing legs to chest and lowering feet to floor, sense counter-thrust of femur bone into socket. When feet rest on floor, sense counter-thrust into sockets.

Roll with counter-thrust of foot against floor. Stand with image of spinous processes merging into tail bone.

ASSIGNMENT: TRACE SPINAL COLUMN IN THREE POSITIONS, NOTING CURVES.

~~DRAW LINES OF TENSION AND COMPRESSION FORCES IN RELATION TO STANDING FIGURE.~~

BODY ALIGNMENT - LESSON III - Axis, Cycle, Hiss, Tensile and Compression

Axis = functioning of muscles as they "work" to balance the spine (tensile and compression forces)

Compression and tensile stresses are called axial, since both operate along the axis without altering it. Three other stresses may be set up which involve the axis in some way or another - torsion, shear and bending.

Torsion - particles of structure twist about the axis involving an alternate compression and tension, or pushing together and pulling apart of the particles without disturbing the axis, although the structure is weakened in that area.

Shearing is caused by force directed against a structure at an angle to its axis so as to cause one part to slide over the other, disrupting the axis.

Bending is a combination of tension and compression applied in such a way that the axis is curved, so that the structure is weakened for support. Caused by an unevenly disposed side load, or a too heavy top load. It is the most serious stress and hardest to counter. (MET-p. 48)

Movement of any one part away from the gravitational axis of the body involves the movement of an opposing part in an opposite direction, or the application of sufficient muscular force to restore the balance of the whole. "Mechanical law explains that the nearer to center weight is maintained, the less expenditure of energy is required to keep it in equilibrium." (MET-56)

"In the human structure the three principal units of weight are the skull, the thorax, and the pelvis. If these are balanced at center in relation to the axis of gravity there will be no unequal strain upon ligaments or muscles about the joints. But if any one of these three bony blocks is not supported at the center of the structure in its natural alignment, more muscular effort must be exerted to maintain its position in space, which involves an unnecessary strain and waste of energy." MET-59)

The longer the spinal axis and the more shallow the curves, the shorter the distance through which the weights must be moved. (By making the lumbar spine straighter from below the head is elevated.) The opposing curves are then closely set to the axis with tensile and compression forces balanced. (The spine can only lengthen downward - there is nothing above the head to "pull" it up.)

Compression force - force of weight downward
tensile force - equal and opposite resistane, resis stretching.

Bones, being compression members because they meet compression stresses successfully (like concrete bridge supports) and the muscles, being tensile members because they resist stretching (like ropes or wires of suspension bridge) , must balance each other.

A bicyle chain is helpful as analogy of the balancing power between the compression members in the back and the tensile members in front. If something happens to make either portion of the chain relax or contract more than the other as it is pulled forward from the large sprocket wheel (as you push on pedal) and is pulled back by the small sprocket (tensile force), it could not move the bicycle forward smoothly.. so with body strength. The weight comes down the back, and the power, gaining in force as the weight accumulates toward the pelvic arch, would unbalance the structure if it were not balanced and checked by t e lifting strength at the front of the spine and of the front muscle-wall connecting the pelvis with the thorax, the neck and head.

"The more nearly the line of gravity - passing through the center of gravity - and the parallel axis of the spine by which the weight is controlled approximate each other, and the lower the center of gravity of the whole, the greater the economy in carrying and controlling the load. " (MET - 204)

"In the transfer of the body-weight to the supporting legs, it is passed through five pelvic joints: the lumbosacral, sacroiliac, and thigh joints, the planes of which are not in vertical alignment; hence, the necessity for balance of ligaments and muscles controlling these joints. It is the very fact that these planes are not in alignment but have spaces between them that makes the difference between a static and a dynamic situation. Organized movement is possible only when loss of balance of the mass, or shift of the center of gravity, may be initiated from within the mass and recovery instigated through the same mechanism. Leverage and opposition of parts are indispensable requirements. If there were no space allowed between the line of gravity of the mass and the axis of the curved structure that controls the load and the axes of the legs which receive the load, we should have no springboard for movement. I n other words, the distance between the lumbosacral joint and the thigh-joints provides a leverage for organized movement. " (MET - 206,7)

"The weight delivered to the sacrum at the back is transferred to the legs at the front, where the thigh-joints, acting like wheels with their hub-lie centers, transfer the body-weight to the moving supports. These joints, with their many diverging muscles and ligamentous fibers forming spokes, act to distribute, guide and absorb the shocks coming toward them through their expansive arc of movement, and offer a great variety of leverage for starting new movements.

"It is by virtue of the character of these univeral joints and their spatial relation to the axis of the spine that coordination in organized movements is effected. Therefore, ... the hip-joints are the important focal points in postural education. . . . . The upward thrust of the femora and the thrust of the spine at the sacrum where the fifth lumbar vertegra delivers the accumulated weight of the body to the pelvis make a continuous adjustment necessary between the tensile and compression members, that is, between muscles, ligaments and bones.

If the legs in alternate action go forward in time to receive the weight, the weight is then controlled centrally, through hip and knee to ankle joint." MET-207,8.

Sit in axis, with weight on sitz-bones. Imagine a bicycle chain around torso from pelvis to head as going up the from of the spine and down the back. Hiss to help activate the action of the front tensile members and to lengthen the back. In standing let femora raise the pelvis as though they were stilts. In sitting lower the pelvis through the aid of the tensile forces holding "up the front."

In standing, image that you are pedaling a bicycle. Sit on the bibycle seat and feel the compression forces in your back carrying the weight into the seat; and imagine that the pavement has a little give, or response, to your feet, as the pedals have; and as you apply your power in walking, think up the front of your body to keep the tensile members integrated.

Standing in circle, employ the above to "circle your axis", recalling that the closer together the compression and tensile force lines are the better in balance and the less energy is required to move the weights.

Turn completely in both directions several times.

Now, turn once and walk in your axis, from the circle, employing the bicycle image of pedaling. Repeat hopping from the circle.

Walk across the room pacing the distance from one circle to another in a straight line; repeat this with the eyes closed.

Add hiss and contraction of body while lying in the constructive rest position. Image the cycle while rolling. Rise in axis.

Assignment - Draw figure from side view and include axis of spine, tensile and compression force lines.

BODY ALIGNMENT - LESSON III - Exercises

I Sitting - Image - CYCLE

A Balance on sitz-bones
B Lift sitz-bones - 2 left, 2 right, 2 left
C Walk on sitz-bones, forward and backward
D Change from sitting to standing

II Standing - CYCLE

A Femur bounce
B Plie
C Small jumps
D Walking
E Small run

III Standing - AXIS

A Circle axis, counter-clockwise 2 times, clockwise 2 times, CC 2 times
B Repeat above and add walking out of circle
C Walk around sensing axis

IV Constructive Rest Position

A Baggy coat, mandarin collar, baggy pants
B Pelvic balloon
C Cycle
D Thigh flexion with cycle
E Roll with axis
F Roll with cycle
G Rise to standing sensing axis

BODY ALIGNMENT - LESSON IV - Exercises

I Sitting - Image, PSOAS ACTION

- A Forward rock ("vibrations up psoas")
- B Lift sitz-bones, 2L, 2R, 2L
- C Walk forward and backward on sitz-bones
- D Rise to stand

II Standing - PSOAS ACTION

- A Femur bounce
- B Swinging walk
- C "Psoas walk" (left, right, left), delineating vertebrae, 3 times each side
- D Walking as though through hip-deep water

III Walking

- A Sensing axis
- B Circle axis - walking and hopping (left, right, left)
- C Circle axis - walking out and hopping out

IV Constructive Rest Position

- A Baggy coat, mandarin collar, baggy pants
- B Pelvic balloon
- C Psoas image
- D Flexion with psoas image (pull from inside top of femur)
- E Roll, sensing image "up psoas"
- F Rise to standing with Psoas image

Body Alignment - LESSON V Exercises

I Sitting circling in pelvis
- A Lift sitz bones
- B Flex thigh
- C Walk on sitz bones

II Sitting - Image "Femur sucked up psoas"
- A. Lift sitz bones
- B Flex thigh
- C Walk on sitz bones

III Standing - Image "Femur merging into psoas"
- A Femur bounce
- B Thigh swing (like thigh flexion)
- C Femur bounce - into jump
- D Walk

IV Standing - Image "Circling in pelvis"
- A Repeat above

V Constructive rest position
- A Images of coat, collar, pants
- B Pelvic balloon
- C Second rib diameter
- D Circling in pelvis - passively, then with thigh flexion (Left, Right, Left)
- E Roll
  1. Image of "femur sucked up psoas"
  2. Image "soften in arm pit"

Assignment: TRACE CRURA AND DIAPHRAGM
TRACE ILIACUS

BODY ALIGNMENT * LESSON VI - Heel foot-Ankle foot, articulation of ankle joint
foot peel

Bones of foot - talus, navicular, calcaneus, cuboid. The muscularture of fot directs weight to the talus - keystone - ankle bone. Rocking action of ankle joint to center weight. Notice articulation of bones allows for movement between talus, calcaneuous, navicular and cuboids.

Notice length of toe bones - from ankle joint.

Trace lines with fingers from toes to "heel" (center of foot.

Soudof foot as anmane action. Use fingers in palm of hand then in foot to exaggerate image.

ligaments run from toe to heel, from side to side of foot to create two arches.

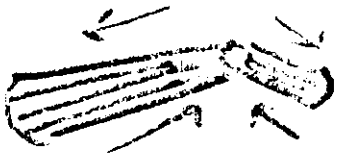
Notice shape of calcaneous, like spinous processes. Drop heel. Let spinous processes drop merging into tail bone, drop to heel.

Ring over big toe - suck big toe up into psoas.

Note: Heel foot -- down the back cycle; Ankle foot, up the front cycle.

Stand with feet in circle - release at ankle joint as the arch is heightened. Avoid sickly by releasing the outside or heel foot. (Note: little toe not attached but rests against side of foot.) Allow for room between talus and heel bone.

Knead joints of foot to fan toes into heel-ankle foot image.



26 bones in foot

BODY ALIGNMENT * LESSON VI - Exercises

I Sitting - Image - femur sucked up psoas

A. Thigh flexion
B. Foot peel (left, right, left)

II Standing - Image - femur sucked up psoas

A. Thigh flexion
B. Foot peel
C. Slow walk - fast walk- slow walk
D. Walk "normally"
E. Walk sensing action at ankle joint

III Constructive rest position

A. Pelvic balloon (coat, collar and pants, too)
B. Hissing with body contraction
C. Ankle flexion
D. Thigh flexion sensing ankle flexion
E. Kneading joints of foot from kneeling

TRACE FOOT FROM THREE VIEWS * TOP, PLANTAR AND SIDE

BODY ALIGNMENT - LESSON VII Rib cage, ribs hanging like Christmas tree, ribs thrust, gutters along spine, pectoralis as fingers growing toward sternum

The rib cage thrusts into spine and hangs (muscle support) Use image of having no muscles and let ribs hang from sockets ...forget roundness and sense only the 45° angle of ribs hanging like Christmas tree branches.- Sense slope rather than horizontal.

Ribs are thrust into spinal sockets at side near lateral processes. Note twist or torque of each rib from top to bottom.

Width of top rib is 1/3 the entire width of shoulder girdle.

With partner, trace fingers (hands) down sides from arm pit through heel foot to emphasize release downward from rib cage to foot.

Note that each rib is attached deeply to spine in relation to dorsal spinous processes. Consider that the "space" on either side of spinous process to lateral processes is a gutter. With partner, sweep downward to clean the gutters.

Use image of folded paper to increase sense of depth and "flexibility" of gutter.

Note the angle of thrust of rib at spine. Imagine a line going through body where rib enters at the back of spine. Imagine that the line comes through at the sternum on the opposite side of the body - to increase sense of narrowing rib cage.

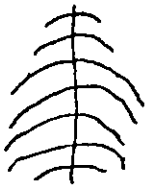
The pectoralis, or breast muscle, may feel tightened. To counteract, imagine the serated inner edges as a hand with long fingers growing toward the sternum.

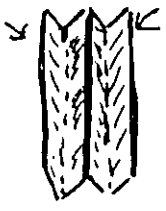
Also, touching armpit edge with opposite hand, will help to sense the lengthening and opening up of the chest.

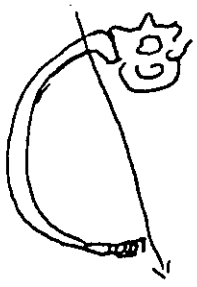
Note that a countraction of the pectoralis to move arm forward should be met by an extension of muscles at the back.

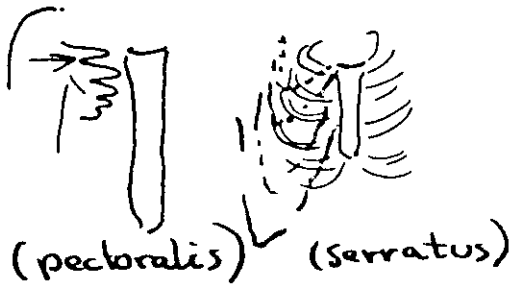
Softening nostrils, one at a time, emphasizes pelvic balloon and reduces tension of pectoralis as well as softening and hanging of ribs.

lower end of
Allow sternum to drop.









Notes from Todd on Rib cage.

p. 107-112

Contour of thorax is determined by shape and slant of each pair of ribs - strong protective cage, moving part of breathing apparatus, and support for body-wall structures (heart and lungs). No two pairs of ribs are alike.

Ribs hang from the spine, joined at bony body and lateral processes on slant. The front end of each rib is considerably below the level of its spinal attachment, some as much as 6 in. The floating ribs function mainly as attachments for the rim of the diaphragm in the bax and the quadratus lumborum which connects the thorax with the pelvis, etc. (Muscles also associated with diaghragm in breathing.

Wall of abdominal cavity extends to the "costal" angle (lower end of sternum) Outer muscles of the abdominal wall run up over the ribs onto the chest wall. The deepest muscle of abdomen (transversalis, runs up on the under side of the ribs, interdigitates with diaphragm.

Sternum is dagger-shaped bone formed from cartilaginous pieces. In adult, the top is on level between second and third thoracic vertebrae. Its curve is symmetrical with top of thoracic spine.

First 7 pairs of ribs are attached to sternum by cartilaginous extensions of their ends. The first pair is fused with cartilage of manubrium, the other pairs fit into the sternocostal articulations, permitting elasticity.

p. 168

By narrowing the lateral diameter of the chest, from arm-pit to arm-pit, the cross-pulls in the spinal muscles in the area of the dorsal angles of the ribs are reduced, the spaces of the gutter of the spine are deepened, and the spinal muscles are freed fo individual action.....The end-result of narrowing the transverse diameter of the rib-cage is to lift the top of the sternum and force it forward.

p. 167 Hissing aids the centering muscles to reduce the lateral diameter, forcing the top of the sternum (manubrium) upward, deepening the cavity at the three top ribs.

p. 163. Man, ignorant of the principles underlying bodily economy, has raised his sense of power from the base, and has raised with it his center of gravity.

BODY ALIGNMENT - LESSON VII - Exercises

I Sitting - Image - ribs hang

A. Lift sitz bones - 2 left, 2 right, 2 left)
B. Thigh flexion

II Sitting - rib thrust

A. Turning trunk
B. Repeat I

III Standing - Image - ribs hang

A. Femur bounce
B. Small jump
C. Small run
D. "Natural" walk

IV Standing - Image - rib thrust

Repeat A-D of III

V Standing - sense levels of joint action in foot

A. Femur bounce
B. Small jump
C. Foot peel
D. "Natural" walk

VI Constructive rest position

A. Pelvic ballon (coat, collar, pants), Passive; blowing through pursed lips
B. Hissing
C. Roll with rib thrust image
D. Stand with ribs hang image

TRACE RIB CAGE - REAR VIEW , DRAW FREE HAND CHRISTMAS TREE

BODY ALIGNMENT - LESSON VIII - Shoulder girdle as cape, sterno-clavicular joint as only boney arm connection

between the spine and the sternum its tensile + compression members.
The shoulder girdle should be balanced on top of the sternum by the clavicles, and
suspended from the neck and head by its own muscular suspensory mechanism. p. 192
The scapula and clavical protect the sternum in strong movement.

13 The integration of thorax + pelvis is possible only when the structure is relieved from cross pulls by arm and shoulder and when the thorax hangs easily suspended from the head ①

The shoulder girdle is like a YOKE such as used to carry pails of water, and is carefully balanced in the center. It is supported in two ways: directly, by suspensory muscles attaching it to the head and to the neck vertegrae, and indirectly via the sternum and the ribs by the compression members of the spine. Mechanicalbalance between these tensile members and compression members is essential togood functioning in this reason. The muscles of the upper chest and shoulders used in breathing, etc., should be freed insofar as possible from the strainof holding unbalanced bones.

This suspending apparatus has two mechanical advantages. First, the weights of the moving shoulders, arms and rib-cage are distributed over a considerable range of small separate attachments,easing theload andproviding for more flexible motion invarious directions than would be possible with any other type of support. Second, a considerable portion of the weight is converted into a top-load because it is transferred tothe head. Here it is hung from the base of the skull, through many small but strong muscles running from the clavicle and sternum and attached to the hyoid and mandible bones, and to the mastoid and styloid processes. Since these structures are in line withthe occipital condyles, the chest and shoulders are balanced with the head. As a result, the head is further stabilized in its balance on the spine, which in turn helps to stabilize the curves of the spine throughout the column. It is by virtue of these muscles,together with the upper jaw musclesand the powerful temporal muscles, that the acrobat is enabled to hang by his teeth. p. 170-Todd

Developmentally, the shoulders and arms start as folds and projections from the muscular body-wall, and the bony framework forms within the so-called "limb-buds", only gradually extending toward the axial skeleton.

The girdle serves as a support for the arms, which are fitted into it by ball-and-socket joints. The whole design is such as toenable the arms to move freely and powerfully in a wide range without bringing any pressure to bear on the upper part of the chest where the heart and lungs are situated.

The triangular scapulae hang at the sides of the chest rather than at the back, the apices pointing downward,and the vertebral borders resting lightly agains the rib-cage... At the upper, lateral corner of each scapula are two projections curved toward the front, the upper one known as the acromion and the lower as the coracoid process. In the front, at the base of the coracoid, is the glenoid cavity, a shallow, cup-like socket, into which the head of the humerous fits. The glenoid cavityis overhung by the acromion and the coracoid. Also the shoulder joint is further protected on all sides by the heavy muscles and ligaments attached to the scapular projections.

The clavicle, with dissimilar ends and a long, twisted body, extends from the scapula to the sternum. Each clavicle is attached tothe sternum by its thick, squarish end at the top of the manubrium, in a strong capsular-ligamentous joint. This joint is provided with an elastic buffer in the form of an articular disc of fibrocartilage, interposed between the cartilaginous end of the clavicle and the manubrium, makingit in effect two joints. This arrangement serves to break the shock from blows on shoulder, arm or hand, which otherwise might be communicated to the sternum, and thus tothe thoracic cavity (shock absorber action). The flat, outer end of each clavicle articulates with the scapula at theacromion through a

a rather small, oval surface and a weak capsular ligament, allowing considerable movement.

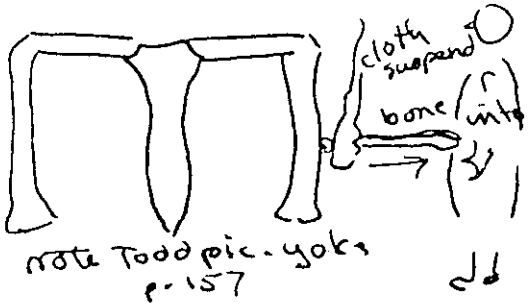
The clavicle furnishes the only bony connection of the shoulders and arms with the trunk. Its mechanical function is to give side support to the shoulder joint for the wide and varied movements of the arm. It acts like a yard-arm, keeping the shoulder-joint free from the chest, and has a definite though limited action in itself. (Clavicle is foundinits strongest form in creatures that climb or fly.)

The direction of the clavicle as it joins the sternum is such as to transmit any shock that passes the first three barriers (glenoid, the acromial-clavicular, the clavicular-sternal) to the whole length of the sternum, where it canbe shared by all ten pairs of ribs attached to it. pp 143-148-Todd

In back at scapula there are weaker muscles to give flexibility. The scapula must rise and fall with shoulder movement.

Exercise: with partner, touch sternum where clavicle attaches and feel shoulders as cape. (luxurious)
note shoulders forward of central axis - better to be forward as starter!
Note: the shoulder does not lift arm. The sterno-clavicular joint acts as fulcrum. Raising the shoulders, i.i. lifting the clavicles causes them to press against the first rib. (Demonstration of cloth + bone)
Exercise: Touch clavicule near shoulder and trace "downward" to s-c. joint.
Exercise: ~~XXXXXXXXXXX~~ Touch sterno-clavicular joint and swing arm into
Tap. Touch sterno-clavicular joint and rotate shoulder forward and backward.
emphasize: curve of clavicle into shoulder.
There is space between the clavicle and first rib (also part of the shock absorbing action). Letting the clavicle hang helps to retain this space.
Exercise: make circle of index finger and thumbaround clavicle and and slikde along clavicle of skeleton. (Slide similarly around own clavicle.)

Exercise: With index finger at sterno-clavicular joint, imagine a circle around clavicular attachment (in frontof first rib), starting fromback, under up, forward and down the front. - let little finger release.



note Todd pic. yoke p. 157

Exercise: sense depth between clavicle and spine

— ends of clavicle into sockets:
Exercise: let clavicle thrust into sternal sockets - let ends extend.

To avoid hyperextension of rib cage - think of sternum as startinghigh under dhin, and the lower end coming in.
Rectus abdominus; superficial muscle starting at lower end of sternum to pubic arch
Allow sections of rectusabdominus to narrow inward (as waves to shore) lengthenin upward on exhalation will allow forgood inhalation.

Note: acromions, tips ofshoulders, will hang easily in line with ear lobes, and the arms will lie along the median line of side body-wall, or in same plane with line of — ove
Grant - p. 192

BODY ALIGNMENT * LESSON VIII - Exercises

I Sitting - Image - arms hang from sterno-clavicular joint

A. Lift sitz bones - 2L, 2R, 2L
B. Thigh flexion

II Sitting - Image - thrust into sterno-clavicular joint

A-B. Above

III Sitting

A. Circle in clavicular joint - passive
B. Swinging arm into lap

IV Standing

A. Alternating shoulder roll - forward, up and center; back, up and center

V Constructive rest position

A. Soften nostrils
B. Breathe with pelvic balloon
C. Psoas lift (lying on stomach, contract psoas muscles to raise body)
D. Hiss with thigh flexion
E. Roll with ribs thrusting into sockets
F. Roll with clavicle thrusting into sockets at sternum

TRACE REAR AND FRONT VIEWS OF SHOULDER GIRDLE

BODY ALIGNMENT * LESSON IX - Exercises

I. Sitting - let mastoid processes hang

A. Lift sitz bones - 2L, 2R, 2L
B. Thigh flexion
C. Head rocking on axis

II. Standing - Image soft nostrils

A. Femur bounce
B. Small run
C. Small jump
D. "Natural Walk"

III. Standing - Image - soft eyes

A-D. Repeat above

IV. Constructive rest position

A. Pelvic balloon - blow passively through pursed lips
B. Thigh and foot flexion with hissing
C. Stand with image of mastoid processes hanging

V. Stand, sensing diagonal lines through body to image higher in front-lower in back. (top of sternum higher than shoulder blades;
lower end of sternum higher than sacrum
ankle higher than heel)

TRACE SKULL - SPINE INTO HEAD: HEAD ARTICULATION INTO SPINE

BODY ALIGNMENT * LESSON X - Exercises

I. Sitting - Image - fibula swing

A. Lift sitz bones - 2L, 2R, 2L
B. Thigh flexion

II. Standing- Image - fibula swing

A. Femur bounce
B. Thigh flexion
C. Femur bounce into small jump
D. Small run
E. "Natural" walk

III. Standing - Image - ulna swing

A. Free arm swing
B. Shoulder roll - single and double
C. Arm raise ("Heeling")

IV Constructive rest position

A. Pelvic balloon - blow passively through pursed lips, then proceed to hissing
B. Practice flexion with and without hiss

C. Body flexion with long neck and shoulder raise

TRACE FIBULA AND TIBIA: ULNA AND RADIUS