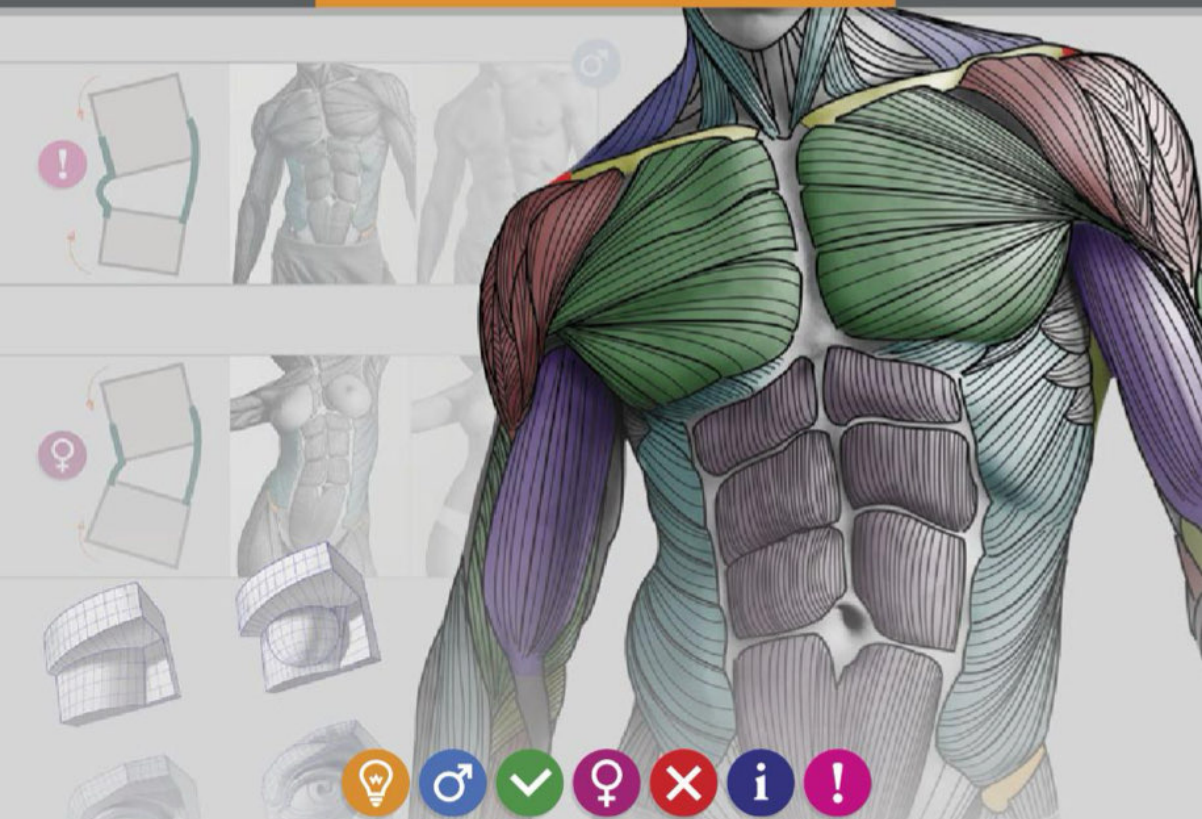


ULDIS ZARINS
WITH
SANDIS KONDRATS

ANATOMY FOR SCULPTORS

UNDERSTANDING THE HUMAN FIGURE



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ANATOMY FOR SCULPTORS

UNDERSTANDING THE HUMAN FIGURE

2014

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ABOUT, HISTORY, BACKGROUND

High Hopes

At the beginning of the 1990s, on the ruins of the USSR, in the newly formed Latvian nation, a young person, named Uldis Zarins, full of ideals and hopes, dreamed of becoming a sculptor. In 1994, he was accepted to the Art College of Riga. Studies were difficult and competition was fierce, but they resulted in satisfaction. Every day he replicated famous classical Greek portraits, busts, and figures in clay. The outlook prevailed, that frequent replication of antique sculptures would facilitate the understanding of form creation. After only half a year, Uldis understood that eyes, of course, adapt, and hands become more agile; however, understanding of the form did not materialize.

The Cheek of the Amazon

One day, when replicating the head of the Amazon portrait of famous sculptor Polykleitos, he ran into a problem: How to construct a cheek? It was clear that the form was not just a sphere, but several complicated forms combined. He thought: "It would be great to understand what these forms are and how they go together!" Teachers only discouraged, saying: "Study, research, measure!" – But what to measure, when there aren't even any corners, nor facets!? A teacher answered: "Study anatomy, maybe you'll get by somehow."

First Anatomy Studies

A modeling teacher told Uldis: "If you want to understand everything, here is a human skull and anatomy book. Study and create an *écorché* for us!" Uldis decided to create a bust with shoulders. All of its muscles were in place, however, the sculpture looked bad. The main thing was that his understanding of the form had not increased one bit! In the place of the form, he had studied muscles. In digging through a mountain of anatomy books, Uldis realized that they were all meant for painters and drawers. He found that all of these books were equally boring, with scant, chaotic drawings. "No one, it turns out, has thought about sculptors!" Uldis found only one anatomy book, which only slightly touched on the form – Gottfried Bammes' *Der nackte Mensch*. Then he asked himself the question: "Why are there so few pictures in the books and so much text!"

Academy Studies

After college, Uldis enrolled in the Art Academy of Latvia (Latvijas Makslas Akademija). There, same as in college, emphasis was placed on exercises, not on the understanding of how to create the form. Each time Uldis created a new sculpture, he made preparations, not only to arrange the frame and the edge, but also drew a small paper sketch where he could analyze the form in an understandable way.

Over the course of several years, drawings, sketches, anatomy books and successful photographs were accrued. Uldis began to notice, that the sketches he had created, as well as images, were in high demand among colleagues. He often heard the suggestion that he should collect them all and publish a book, which would be a composite of form analysis, as well as fundamental information about anatomy that sculptors would need to know. This was how Uldis came up with the idea for the creation of the book.

Kickstarter

Years went by and Uldis created the website anatomy4sculptors.com, a proportion calculator, and Facebook page, where he publishes anatomy reference images and his drawings. On the Facebook page, Uldis engaged in conversations and tested the ways of explaining the human anatomy. In the spring of 2013, with the help of friend Sandis Kondrats, a Kickstarter campaign was organized, creating an international team, with whose help Uldis realized his dream of publishing the book, *Anatomy for Sculptors*. During the project development phase, Sandis and Uldis were joined by friends from Latvia, Sabina Grams and Edgars Vegners, who contributed with their expertise in Graphic Design and Photography. With much help from Sandis' brother Janis Kondrats, we were able to create a unique subscription system on the website to engage and test the book's content with the project supporters. As English is a second language for Uldis and Sandis, the assistance of editors and proofreaders, Monika Hanley and Johannah Larsen, was indispensable. Friendships, created through the project with Chris Rawlinson and Sergio Alessandro Servillo, filled in the blanks with 3D scans and sculpt reference materials. The Shutterstock service, which supplied Uldis with a lot of great artwork to build on the book's content, was also a great help. Thanks to the friends of the international sand sculpting community, with whom Uldis and Sandis had conversations about the book during their travels over the course of the year, which was a great help in the book's development process. The support of the Seattle Latvian community was very special while working on the project. Also, without the support and understanding of the families and friends of Uldis and Sandis, this project would not have been possible.

Finally, the book has come into physical form after hard and passionate work over the course of 20 years, since Uldis came up with the dream of creating such a book. It took him 11 years of classical art studies, over 200 international sculpting festivals, symposiums and exhibitions in 9 years and the past 4 years spent on reading books, researching human anatomy, and creating illustrations for this book to come to life.

SUMMARY

FIGURE & TORSO

SKELETON	8-12
MALE VS FEMALE SHAPES	13-14
SILHOUETTE	15
CONTRAPPOSTO	16
LAZY "S"	17
MOVABLE MASSES	18-19
REALISTIC TO SIMPLIFIED	20-21
ANGULAR RELATIONSHIP	22
HORIZONTAL CROSS SECTIONS	23
ÉCORCHÉ AND REAL	24-25
MUSCLES AND LANDMARK POINTS	26-27
ABDOMINAL MUSCLES	28-29
MOST IMPORTANT MUSCLES	30-32
CLAVICLE	33
CHEST MUSCLES	34-36
FEMALE BREAST	37-40
SHOULDER MUSCLE	41-45
TRAPEZIUS MUSCLE	46-47
SERRATUS ANTERIOR	48-49
BROADEST MUSCLE OF THE BACK	50-51
GREAT ROUND MUSCLE, LITTLE ROUND MUSCLE AND INFRASPINATUS MUSCLE	52
ABDOMINAL EXTERNAL OBLIQUE MUSCLE	53
HIPS	54
BUTT	55
SUBCUTANEOUS FAT PADS	56-59
OBESE PROPORTIONAL CHANGES	60-61
FAT ACCUMULATION	62
3D SCAN	63-71
ARMS REFERENCE	72-88
SHOULDER BLADES	89
PROPORTIONS	90-92

HEAD & NECK

SKULL BONES	94
MUSCLES	95-97
SKULL	98-99
HEAD SHAPE AND MASSES	100
BABY HEAD	101
HEAD SHAPE	102
EYES	103-109
JAW	110
MOUTH	111-116
PLATYSMA MUSCLE	117
STERNOCLEIDOMASTOID MUSCLE	118
NECK MUSCLES	119-120
EAR	121
NOSE	122-123
FACIAL MUSCLES	124
WRINKLES	125
PROPORTIONS	126-130
GENDER DIFFERENCES	131
EMOTIONS	132-142

7

UPPER LIMB

HAND AND WRIST MUSCLES	144-145
HAND AND WRIST BONES	146
MUSCLES OF UPPER LIMB	147
SUPINATION AND PRONATION	148-153
PARTIALLY FLEXED ARM	154
BICEPS AND TRICEPS	155-159
BRACHIALIS AND CORACOBRACHIALIS	160-161
BRACHIORADIALIS AND EXTENSOR CARPI RADIALIS LONGUS	162-163
ANCONTEUS, EXTENSOR CARPI ULNARIS, EXTENSOR DIGITI MINIMI AND EXTENSOR DIGITORUM	164
SUPINATION AND PRONATION	165
FLEXOR MUSCLES	166-168
ABDUCTOR POLLICIS LONGUS AND EXTENSOR POLLICIS BREVIS	169
ULNA	170
ARMS CONNECTION	171
BLOCKING OUT ARM	172-173
HANDY TIPS	174-175
FINGERS	176
PROPORTIONS	177
HAND	178
SHAPING HAND AND FINGERS	179
HAND MOVEMENTS	180
WRIST POSITIONS	181
FINGERS	182
AGING HANDS	184

LOWER LIMB

BONES	186-187
MUSCLES	188-189
3D SCAN	190-191
BONY LANDMARKS	192-194
MALE LEG SHAPES	195
QUADS	196
SARTORIUS MUSCLE	197
ADDUCTOR MUSCLES OF THE HIP	198
FLEXORS OF THE THIGH	199
CALVES	200-201
EXTENSOR DIGITORUM LONGUS AND TIBIALIS ANTERIOR MUSCLES	202
PERONEUS BREVIS AND PERONEUS LONGUS MUSCLES	203
TIPS	204
CROSS SECTION	205
KNEE MECHANICS	206
THE KNEE	207
3D SCAN	208-210
FEMALE LEGS	211
LEG SHAPES	212
3D SCAN	213
TRAVERSING	214
ADDITIONAL SHAPES	215
FOOT MUSCLES	216
FOOT SHAPES	217-219
3D SCAN	220-221
BABY FEET	222

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Karen Jean Fralich
Kasper Appel
Kirk Rademaker
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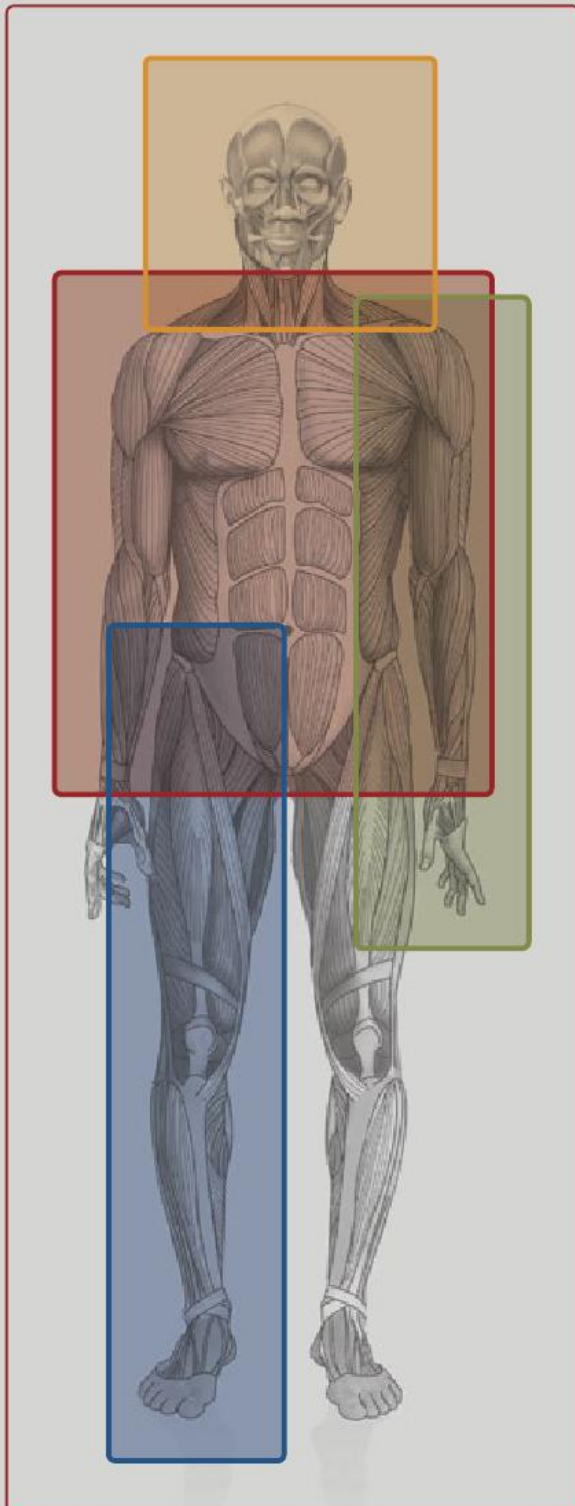


FIGURE & TORSO

7



HEAD & NECK

93



UPPER LIMB

143



LOWER LIMB

185

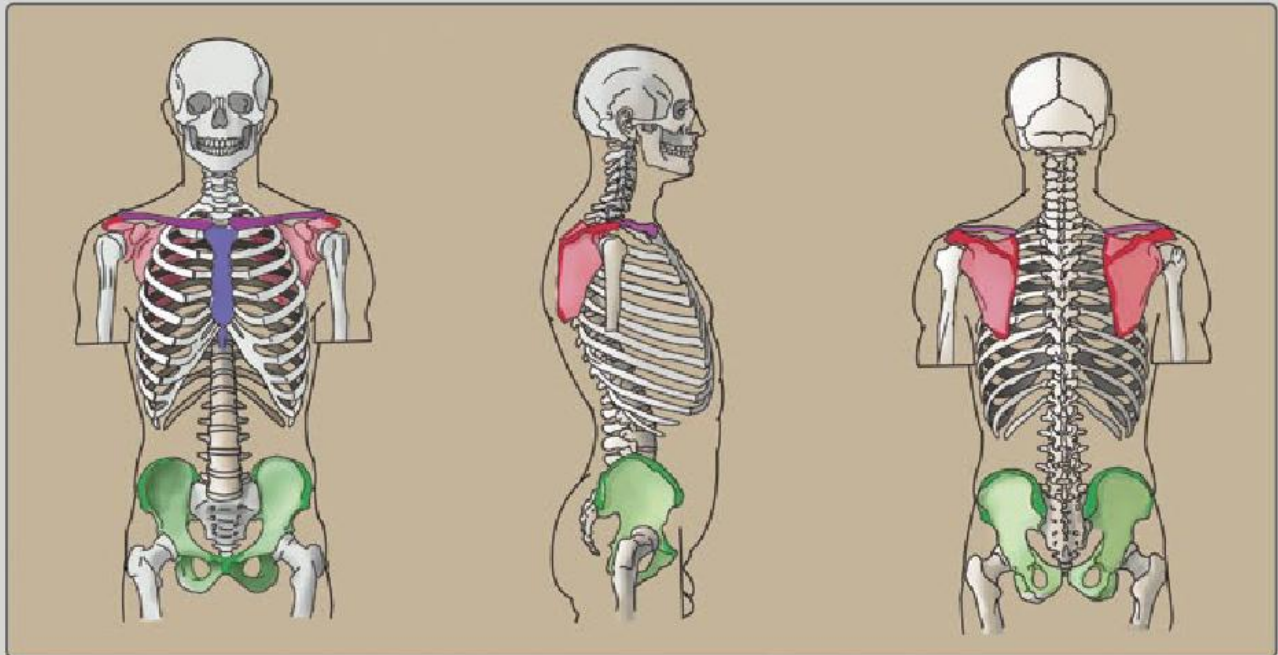
HUMAN SKELETON



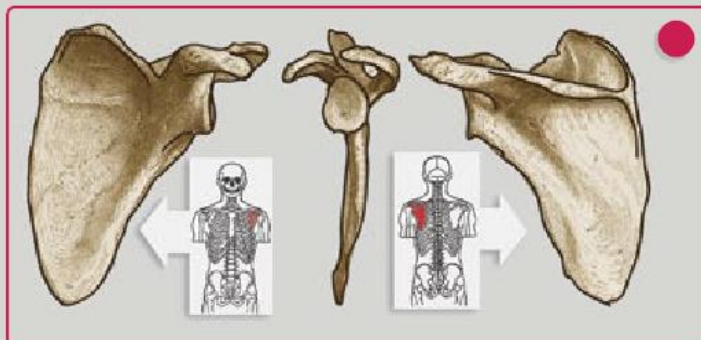
IMPORTANT LANDMARKS OF TORSO

i

PROMINENT SUBCUTANEOUS PROTRUSIONS – GENERALLY POINTS OF BONE, THOUGH SOMETIMES FORMED BY ENTIRE BONES, ARE CALLED BONY LANDMARKS OR SIMPLY LANDMARKS. THEY MAY SERVE AS IMPORTANT PROPORTIONAL MEASURING POINTS OF THE BODY. LANDMARKS ARE THE KEY TO UNDERSTANDING THE EXACT POSITION OF THE ENTIRE SKELETON, WHICH FOR THE MOST PART IS EMBEDDED IN THE SOFT TISSUES OF THE BODY.



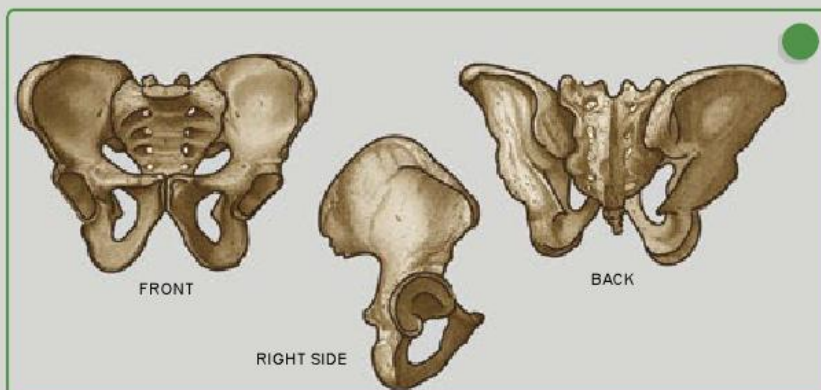
SHOULDER BLADE (SCAPULA)



CHEST BONE (STERNUM)



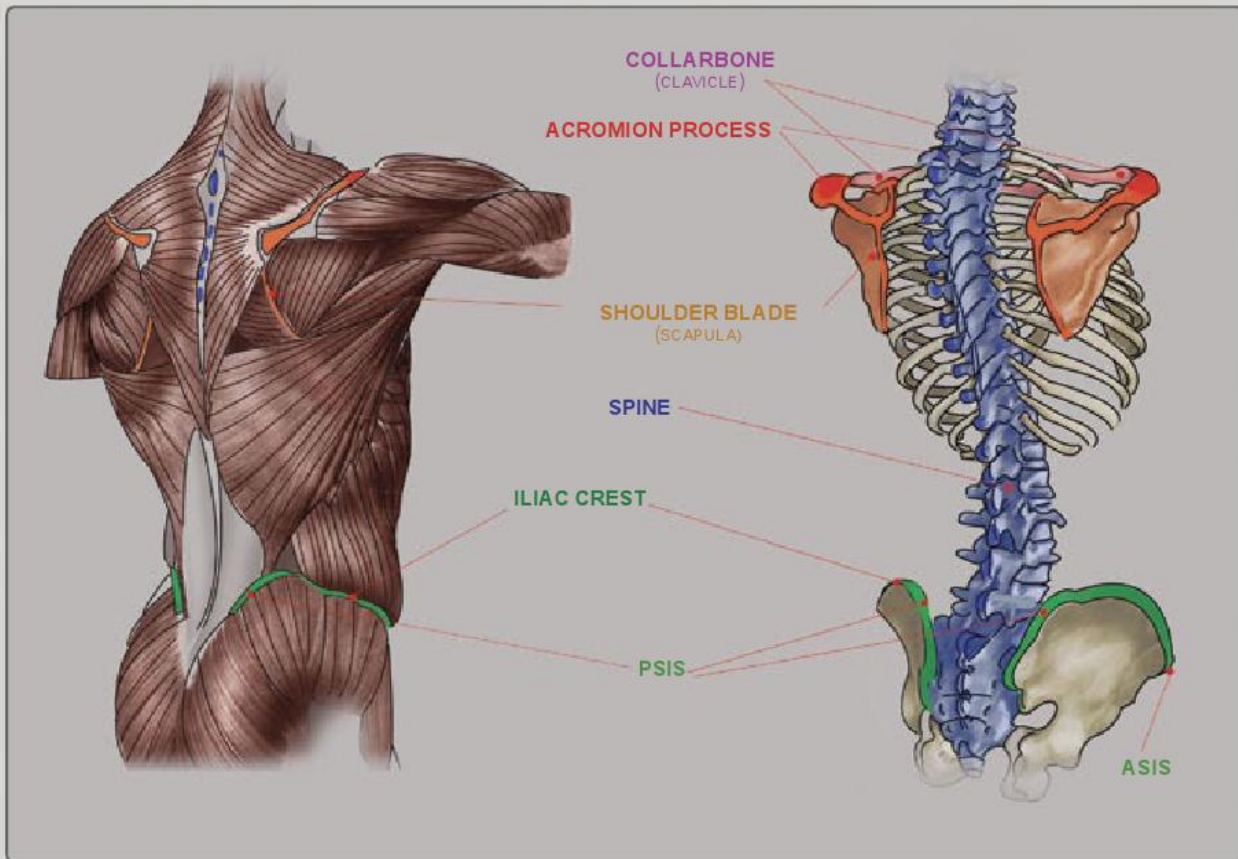
PELVIS



CLAVICLE



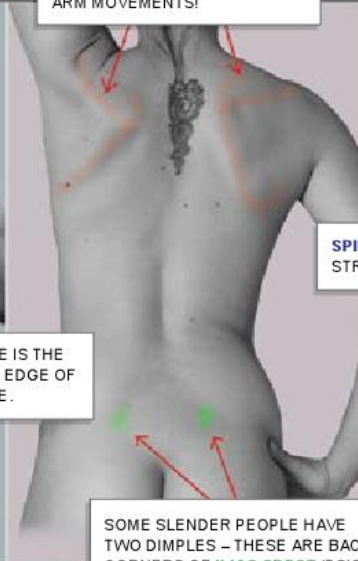
MAIN LANDMARKS OF BACK OF THE TORSO



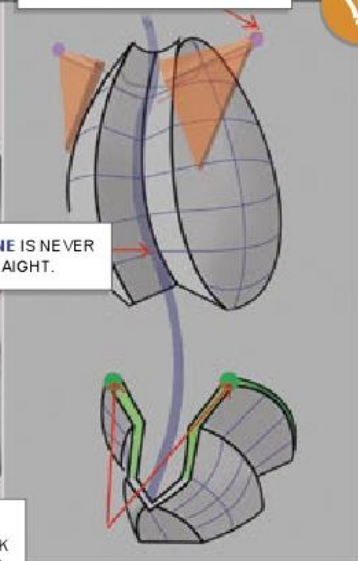
THE MALE'S **SHOULDER BLADE** IS COVERED BY A THICK LAYER OF MUSCLES AND IS HARDER TO LOCATE THAN A FEMALE'S.



PAY ATTENTION TO POSITION OF **SHOULDER BLADE** DURING ARM MOVEMENTS!



AC JOINT IS WHERE **CLAVICLE** MEETS **ACROMION**.



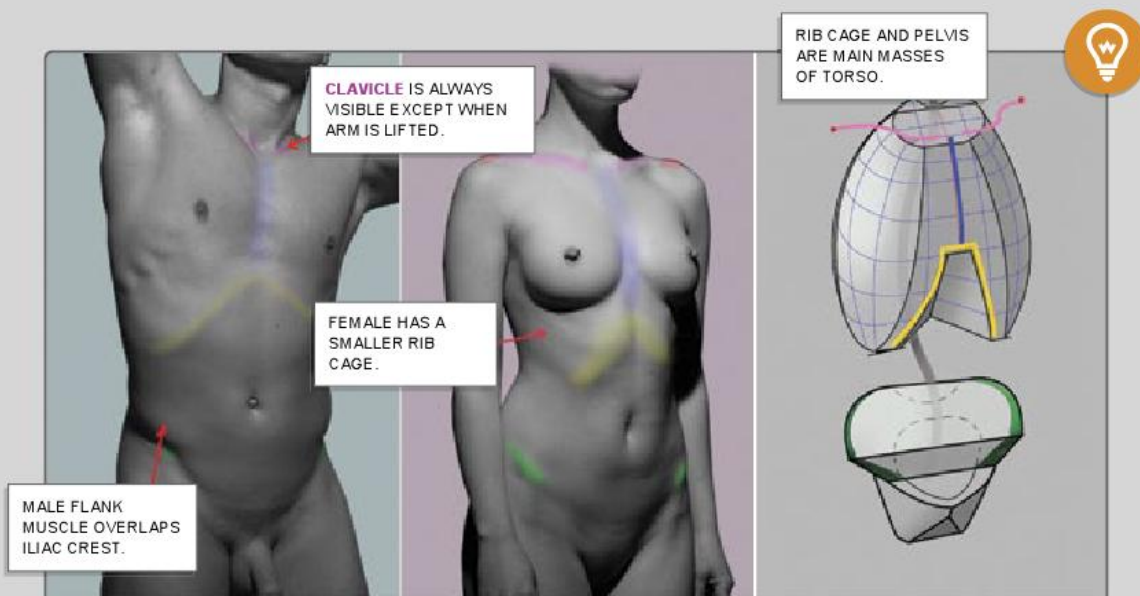
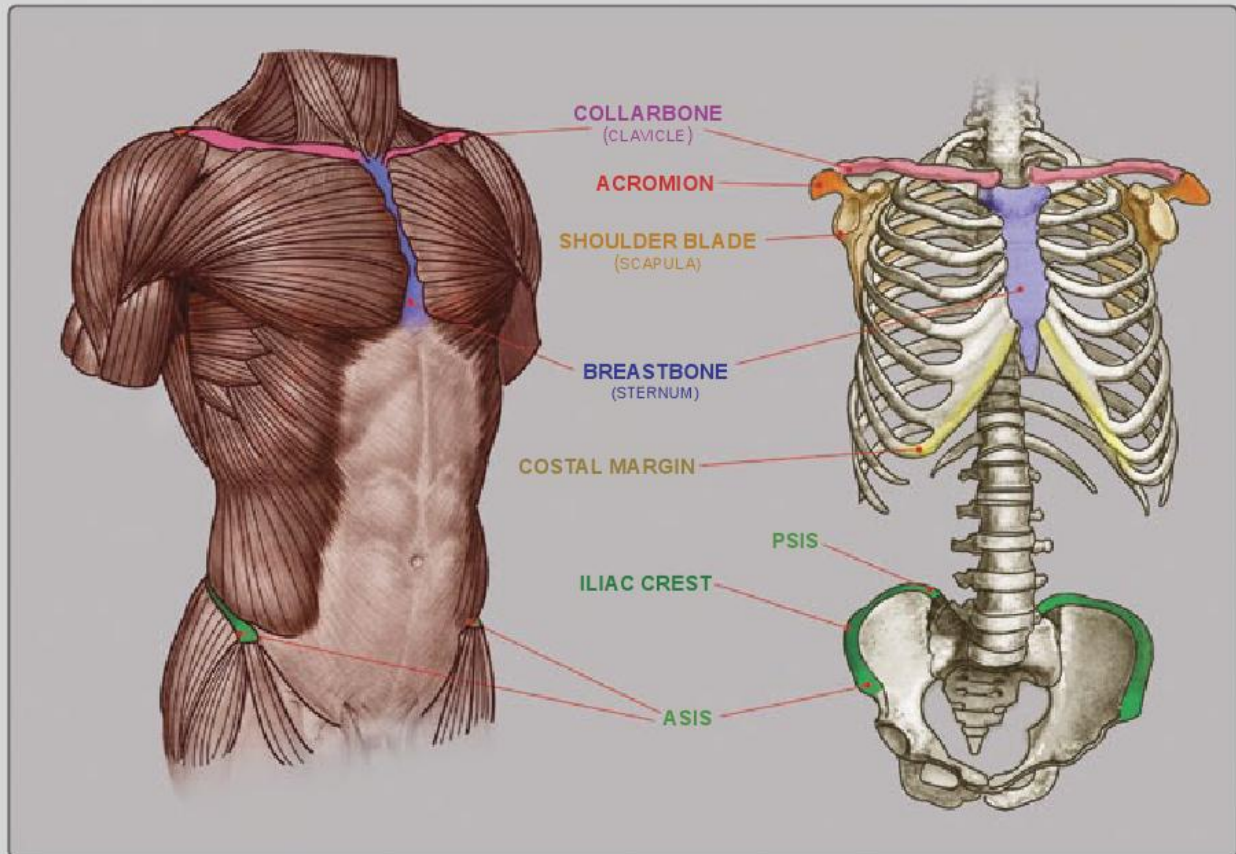
SPINE IS NEVER STRAIGHT.

THIS LINE IS THE BOTTOM EDGE OF RIB CAGE.

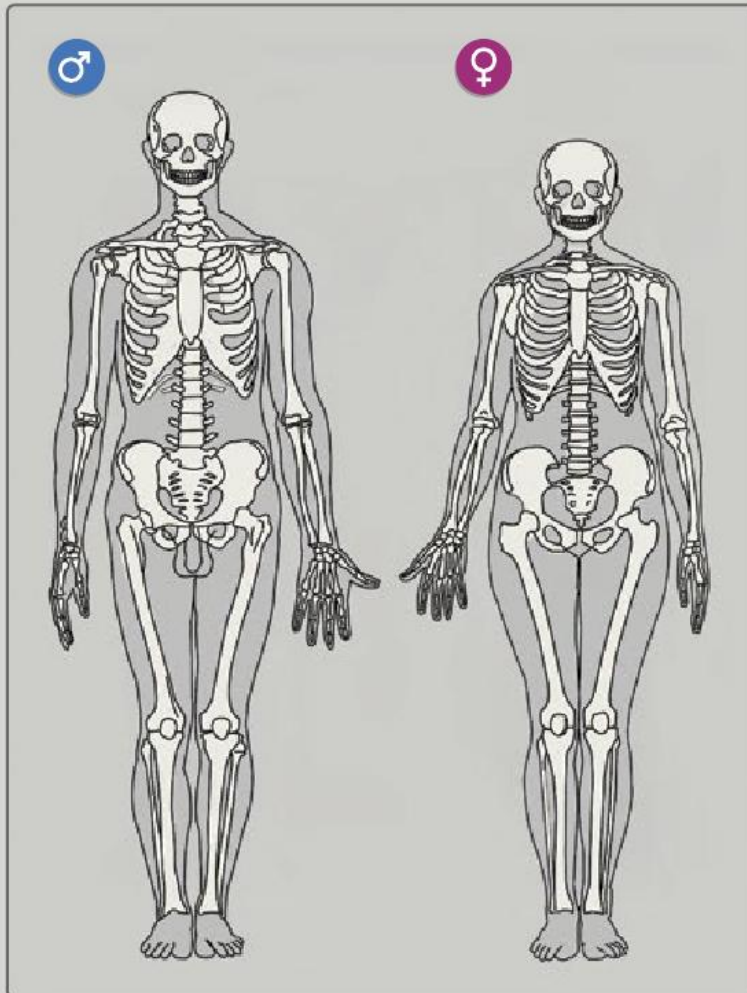
SOME SLENDER PEOPLE HAVE TWO DIMPLES – THESE ARE BACK CORNERS OF **ILIAC CREST** (PSIS).

MAIN LANDMARKS OF FRONTAL TORSO

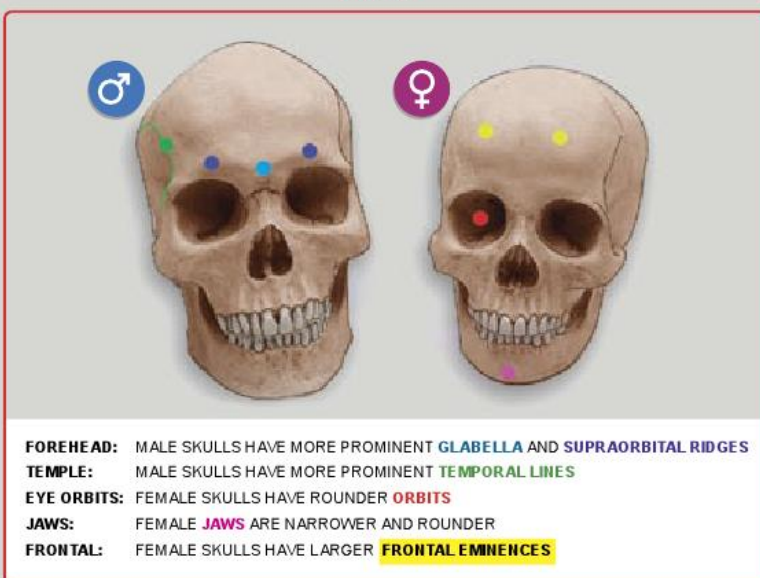
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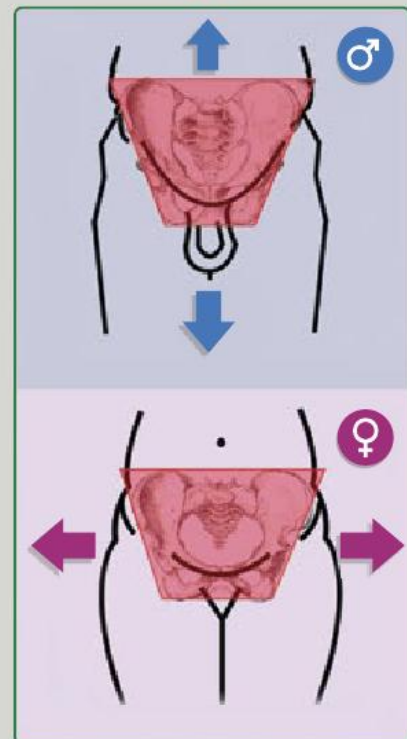
MAIN DIFFERENCES BETWEEN MALE AND FEMALE SKELETONS



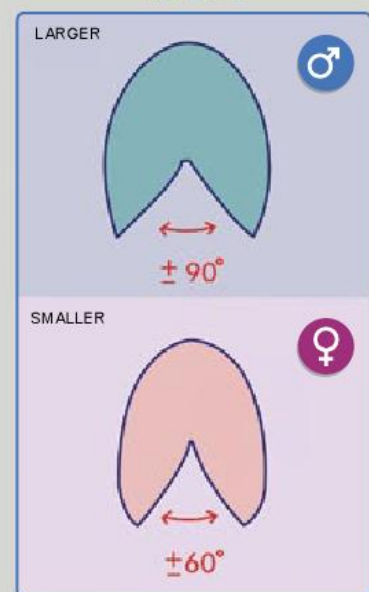
SKULL



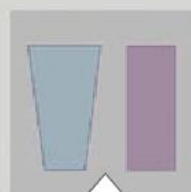
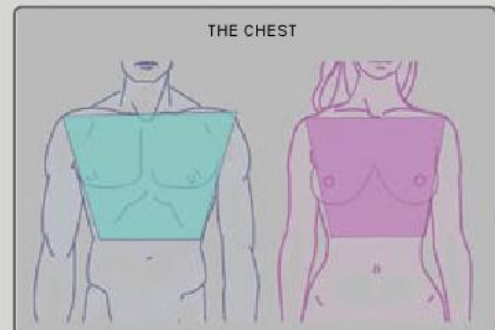
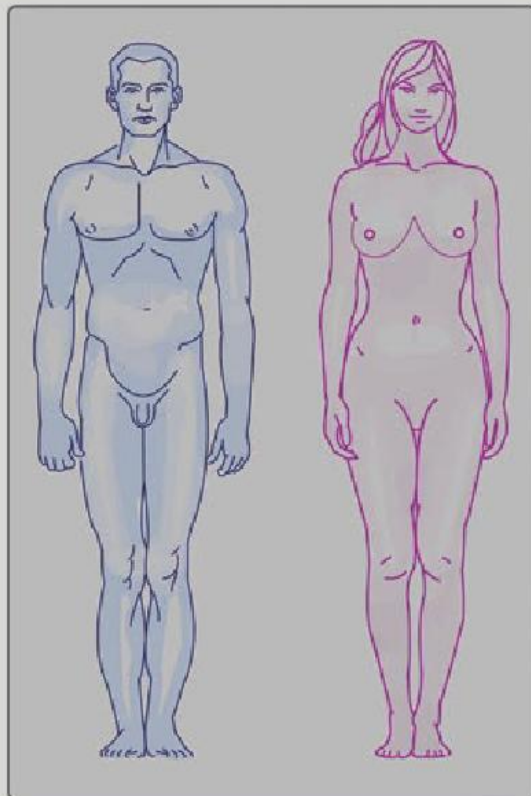
PELVIS



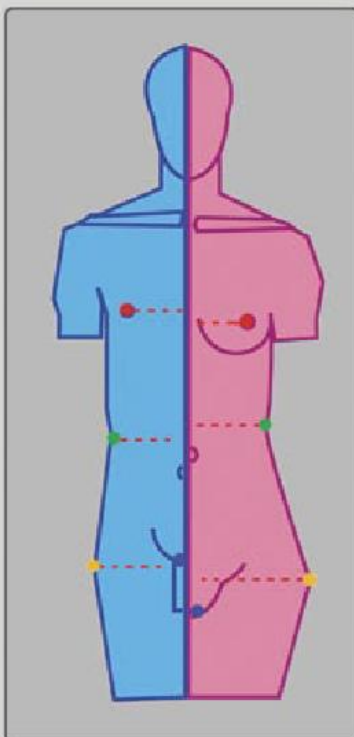
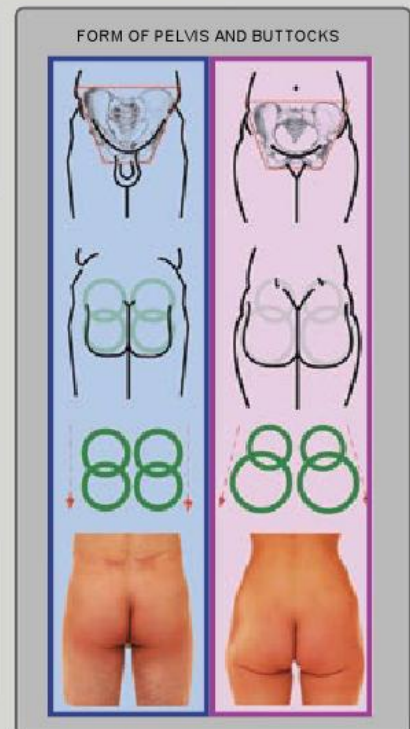
RIB CAGE



MOST IMPORTANT DIFFERENCES BETWEEN MALE AND FEMALE BODY SHAPES

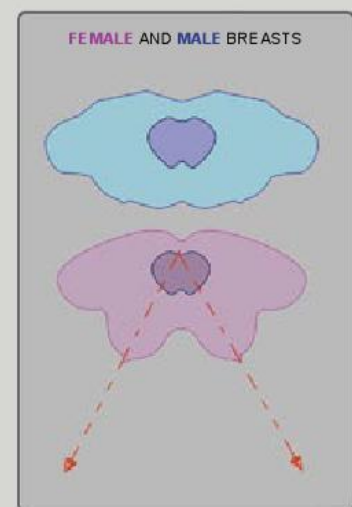
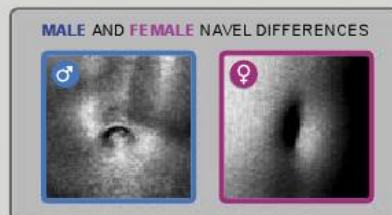


NOTE:
DIFFERENCE IN
SILHOUETTE
AT SHOULDERS
AND HIPS.



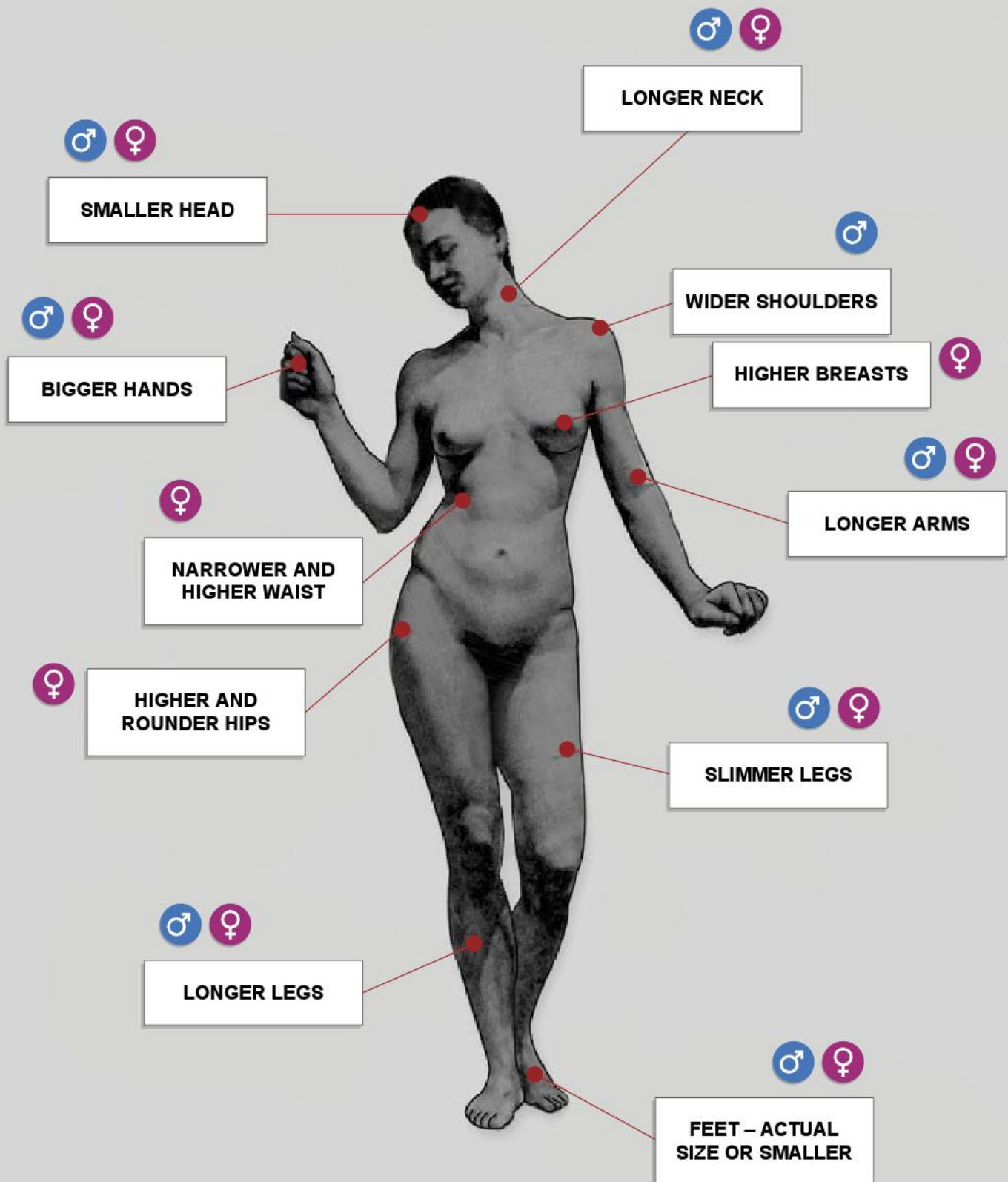
FEMALE FORMS ARE
SOFTER AND CURVILINEAR.
MALE FORMS ARE MORE
ANGULAR.

FEMALE HAS SLIGHTLY
THICKER SUBCUTANEOUS
FAT THAN MALE.

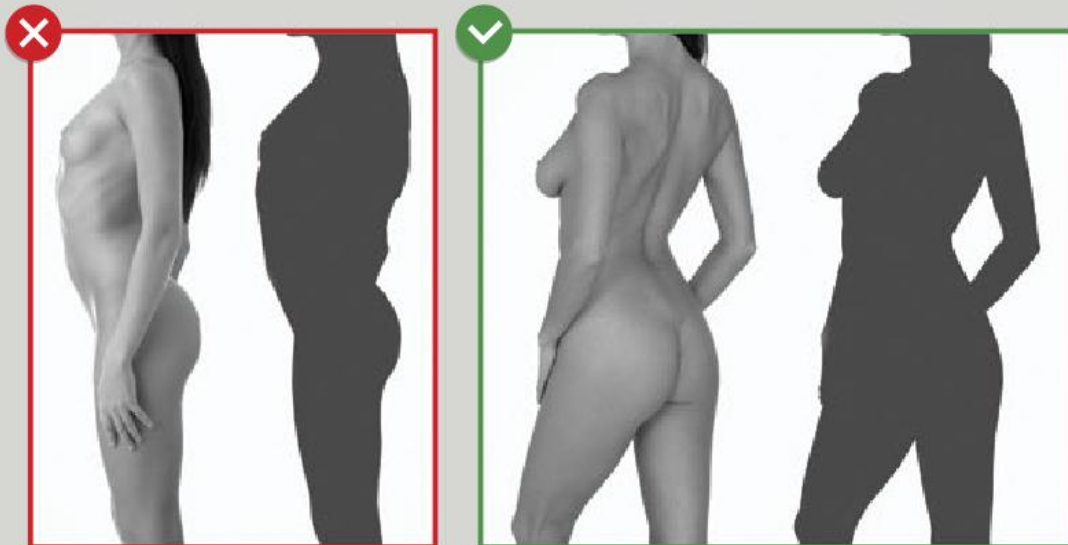


HOW TO MAKE A FIGURE MORE ATTRACTIVE

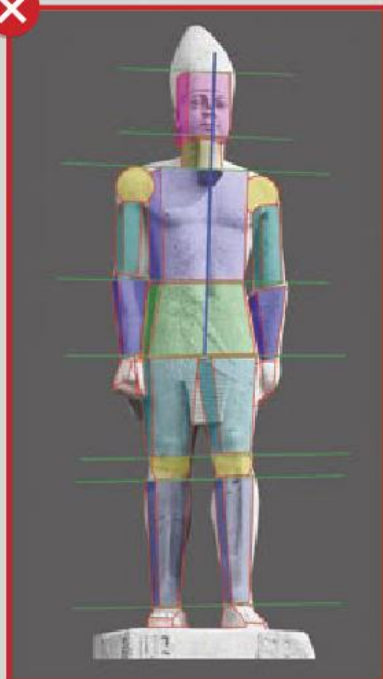
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SILENT KILLER



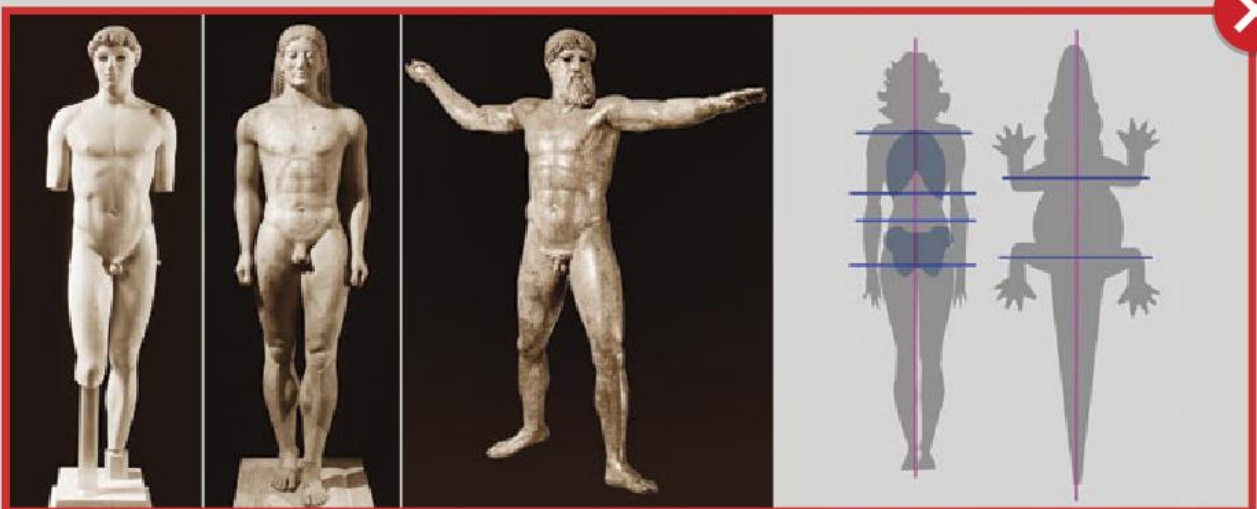
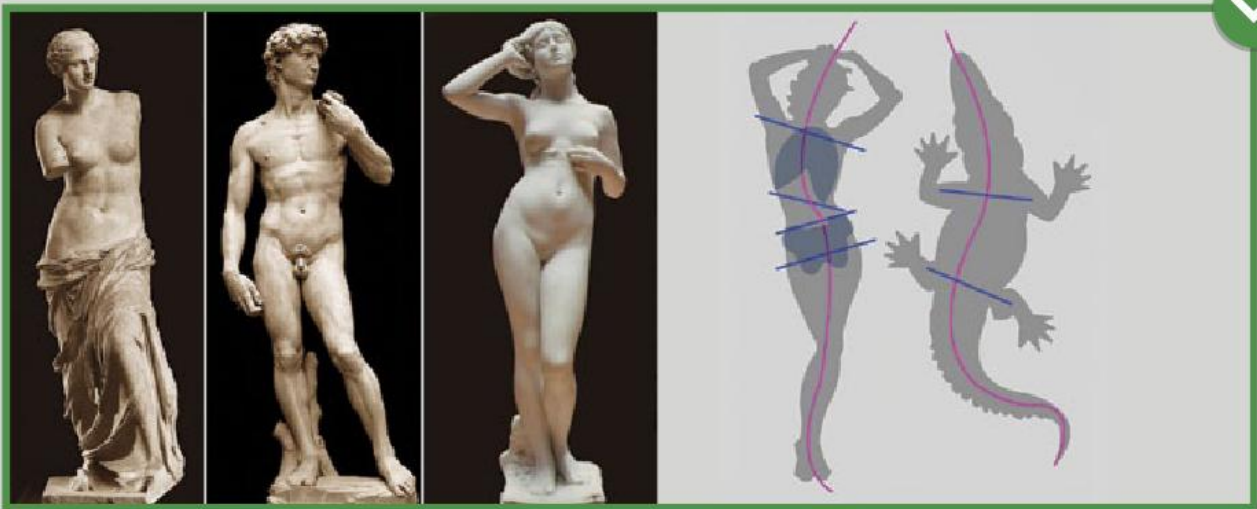
THE MOST ESSENTIAL ELEMENTS IN FIGURE SCULPTURE NEED TO BE FAR ENOUGH FROM THE BODY. IF YOU CAN'T EASILY DISTINGUISH YOUR CHARACTER BY SILHOUETTE ALONE, THEN RECONSIDER THE COMPOSITION! AN UNCLEAR SILHOUETTE IS THE "SILENT KILLER" OF DESIGN!



ANOTHER KILLER IS **SYMMETRY**! SYMMETRICAL FIGURE SEEMS LIFELESS AND BORING.

CONTRAPPOSTO

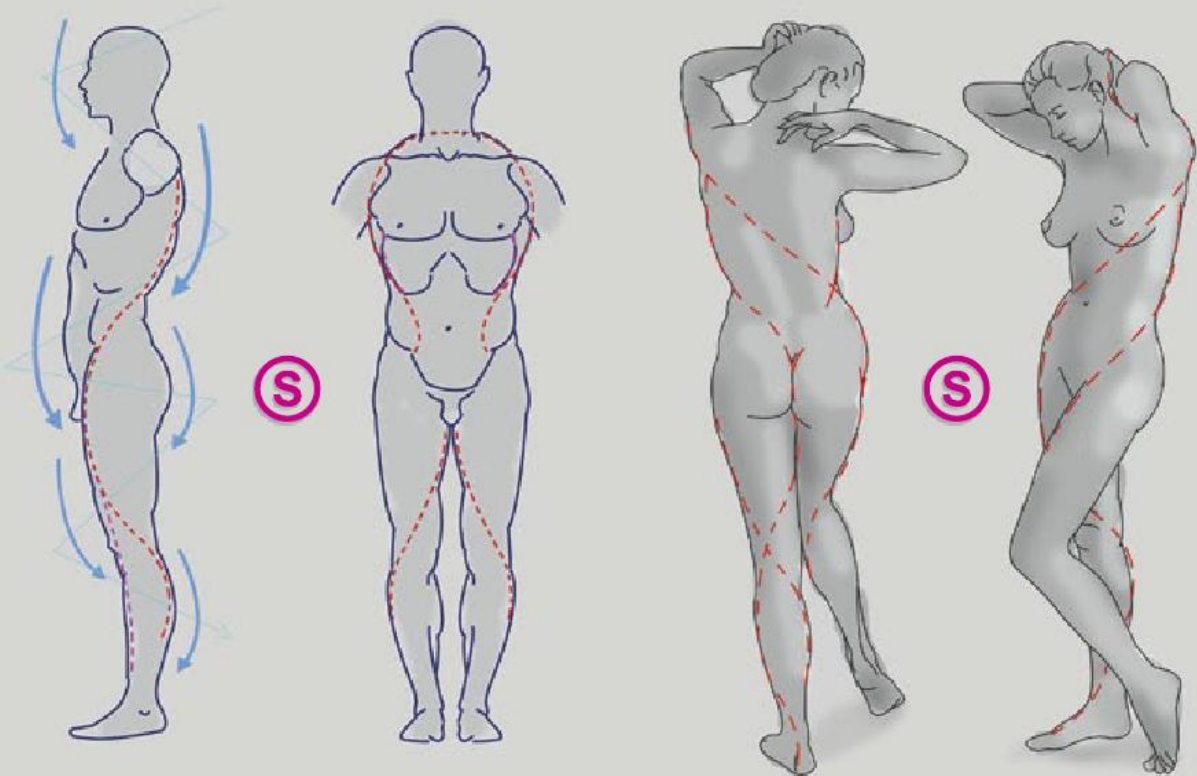
THIS TERM DESCRIBES THE POSITION OF A FIGURE IN WHICH THE HIPS AND LEGS ARE TURNED IN A DIFFERENT DIRECTION FROM THAT OF THE SHOULDERS AND HEAD; THE FIGURE TWISTS ON ITS OWN VERTICAL AXIS. THE FIGURE'S BODY AND POSTURE IS DEPICTED AS A SINUOUS OR SERPENTINE "S" SHAPE.



LAZY "S"



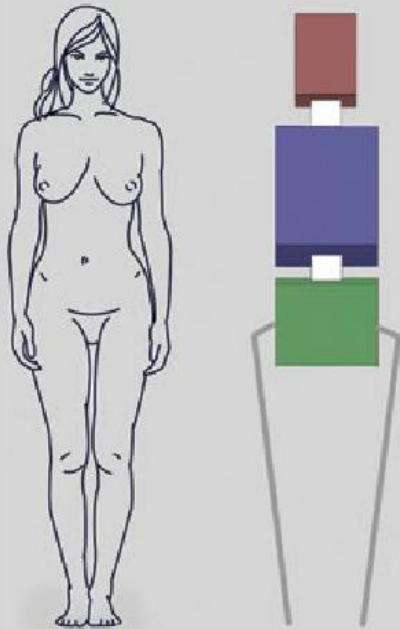
DRAW IMAGINARY S-SHAPED LINES AND BY FOLLOWING THEM, YOU CAN EASILY CONSTRUCT THE CURVES OF THE BODY.



5 POSITION COMBINATIONS OF MOVABLE MASSES



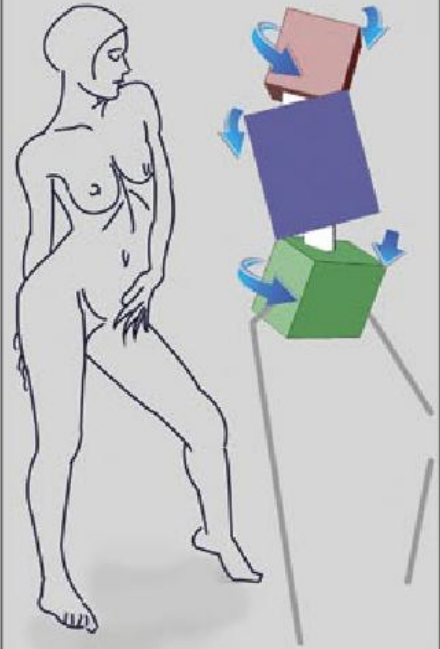
ERECT



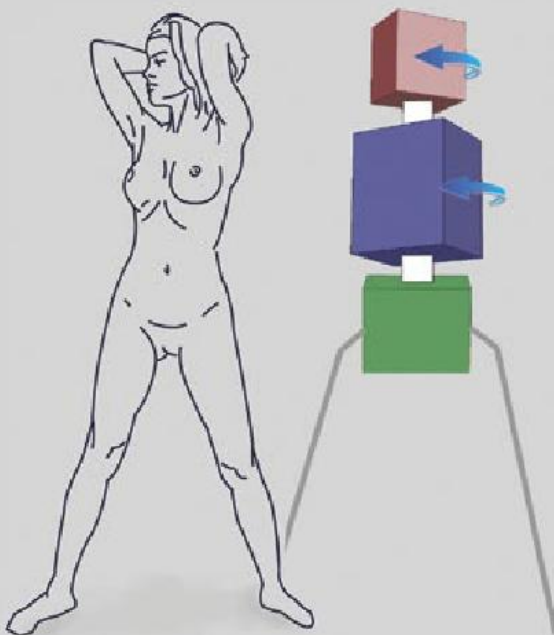
TIPPED BACK



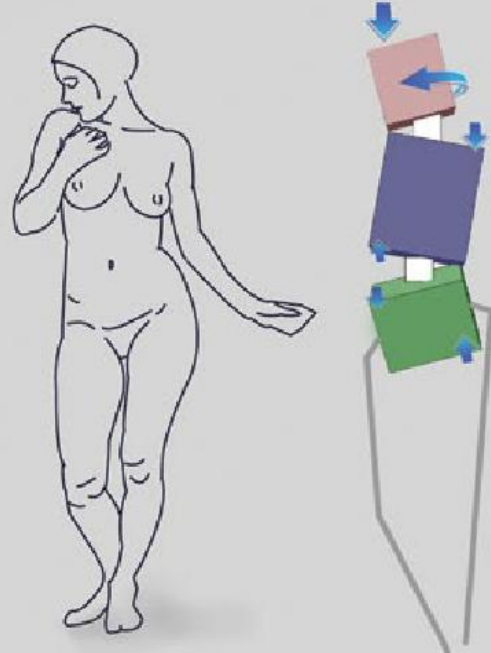
COMBINATION



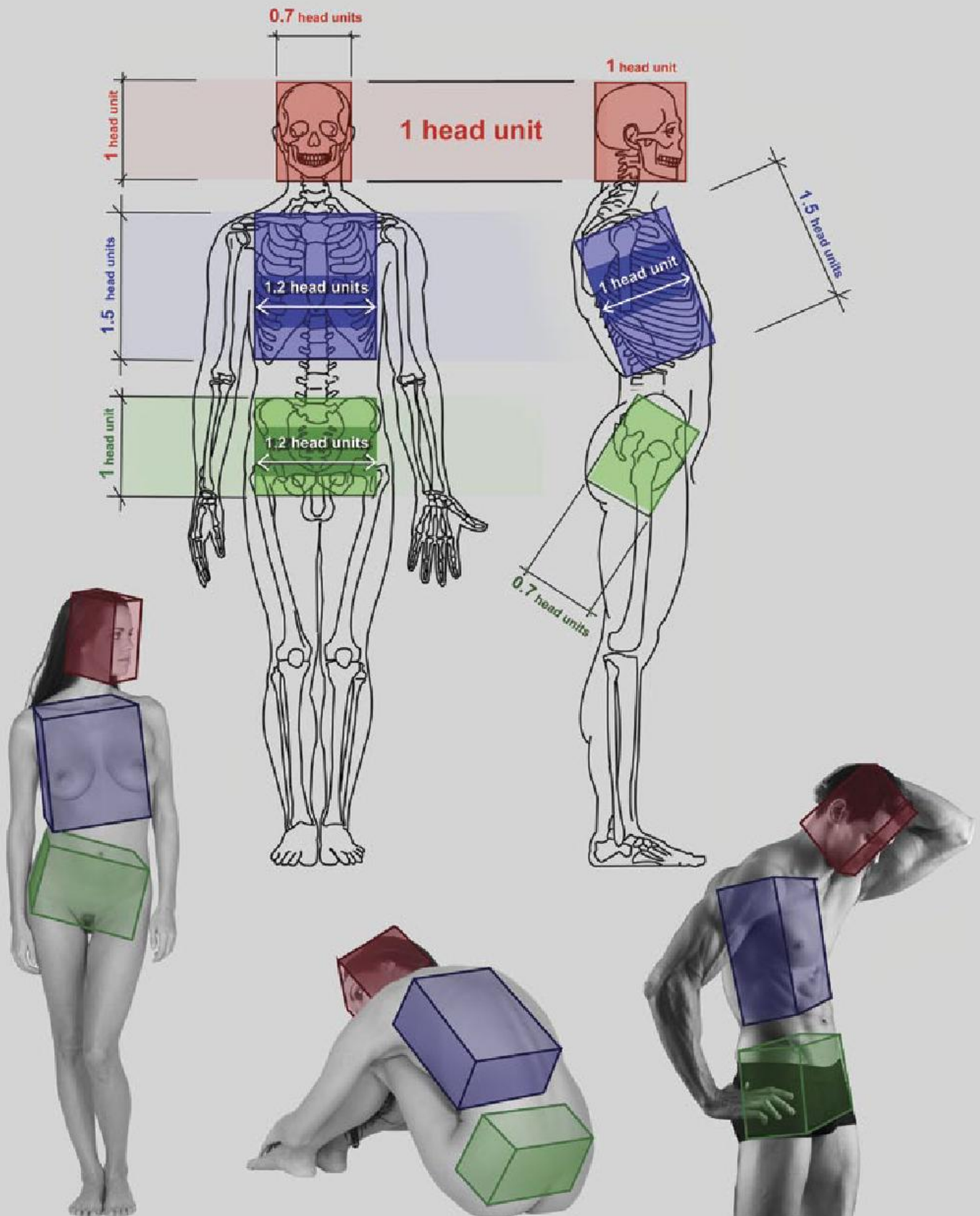
ROTATED



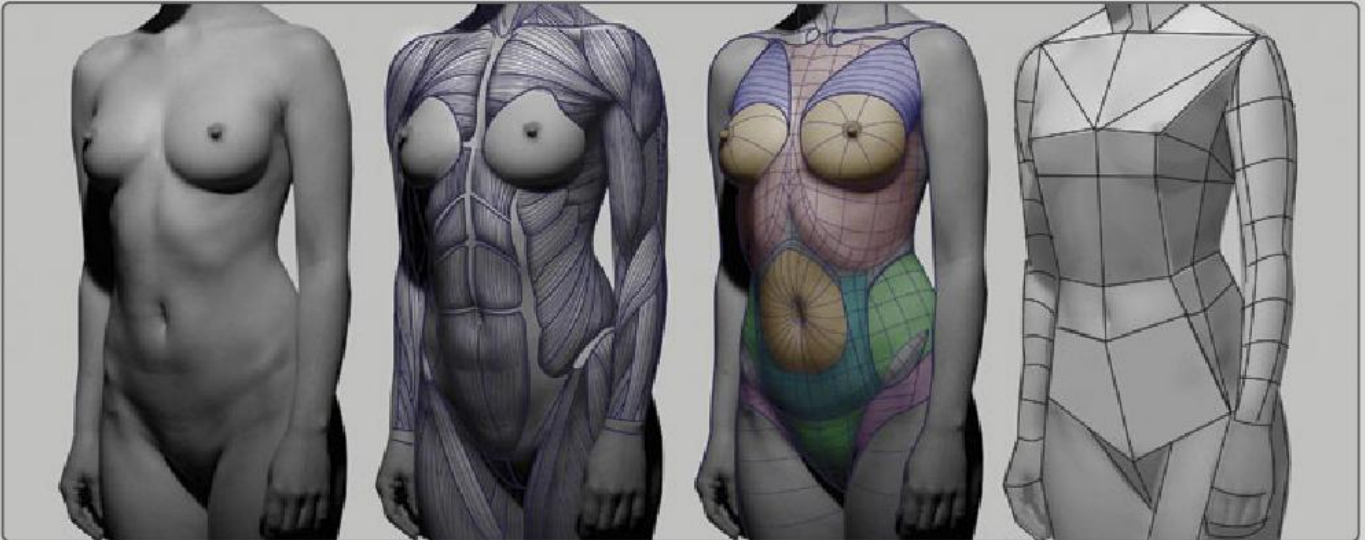
TILTED



PROPORTIONS IN HEAD UNITS OF MOVABLE MASSES



FEMALE TORSO FROM REALISTIC TO SIMPLIFIED

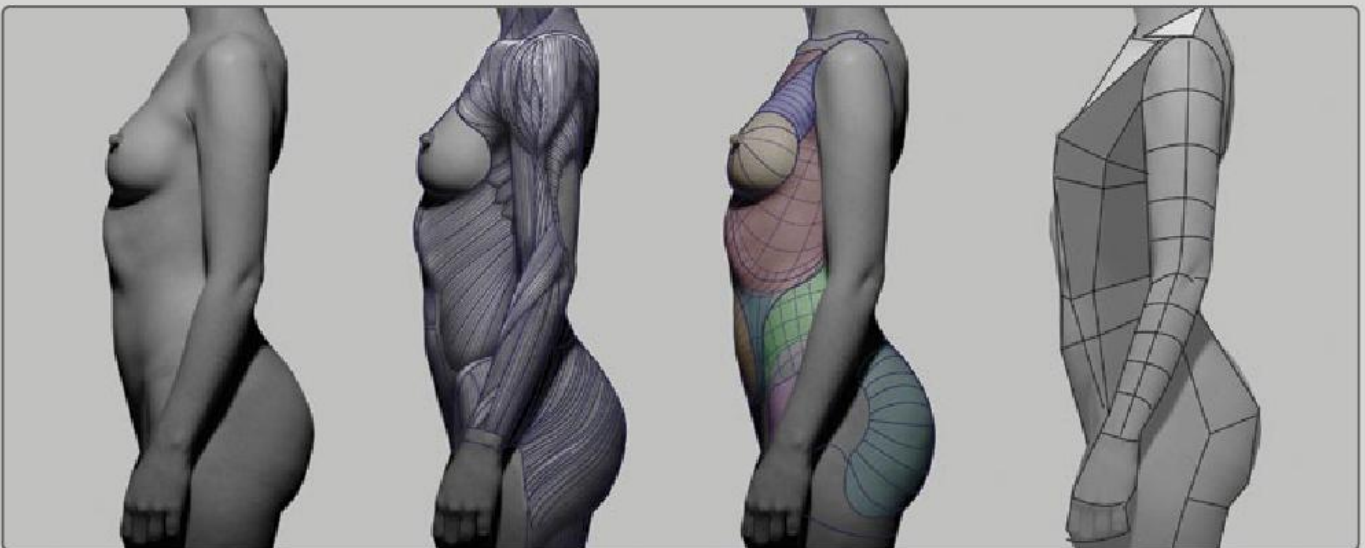


REAL

MUSCLES

SHAPES

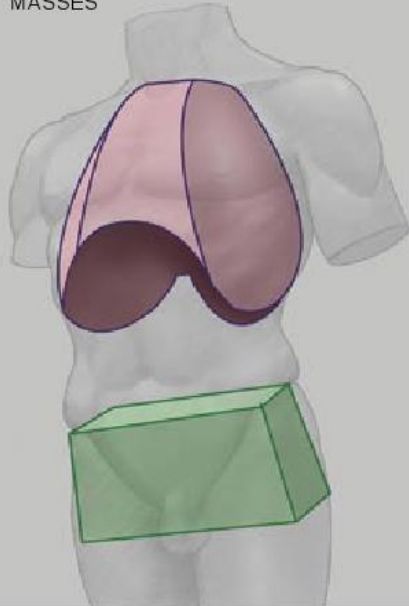
BLOCK-OUT



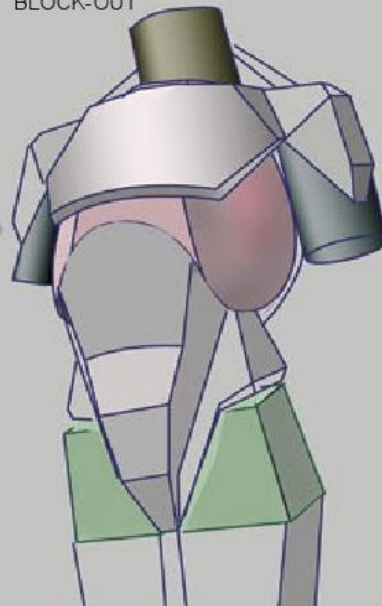
MALE TORSO FROM REALISTIC TO SIMPLIFIED



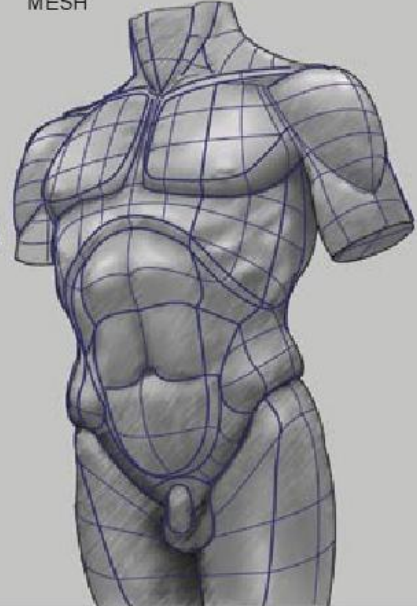
MASSSES



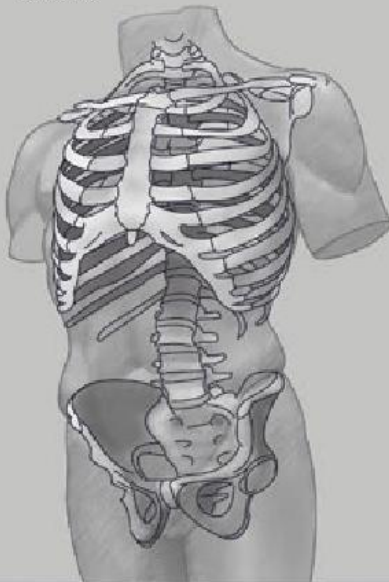
BLOCK-OUT



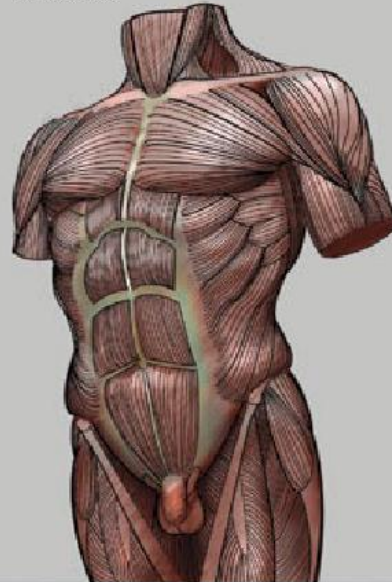
MESH



BONES



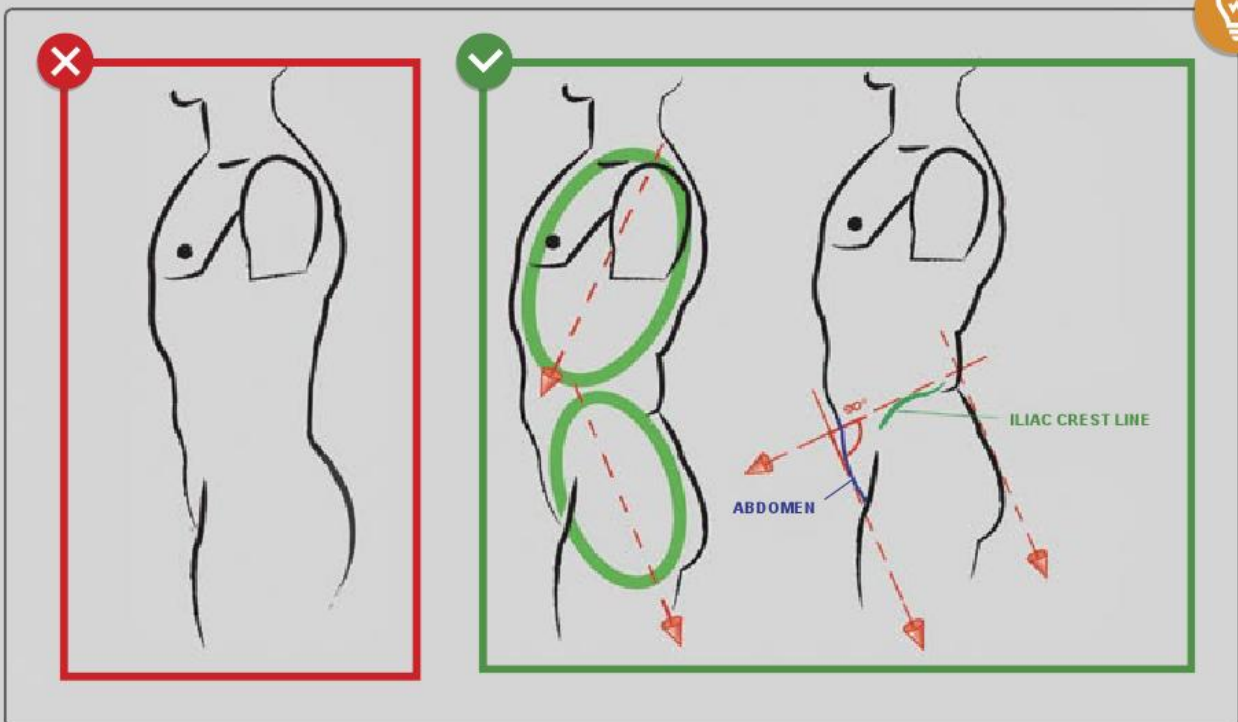
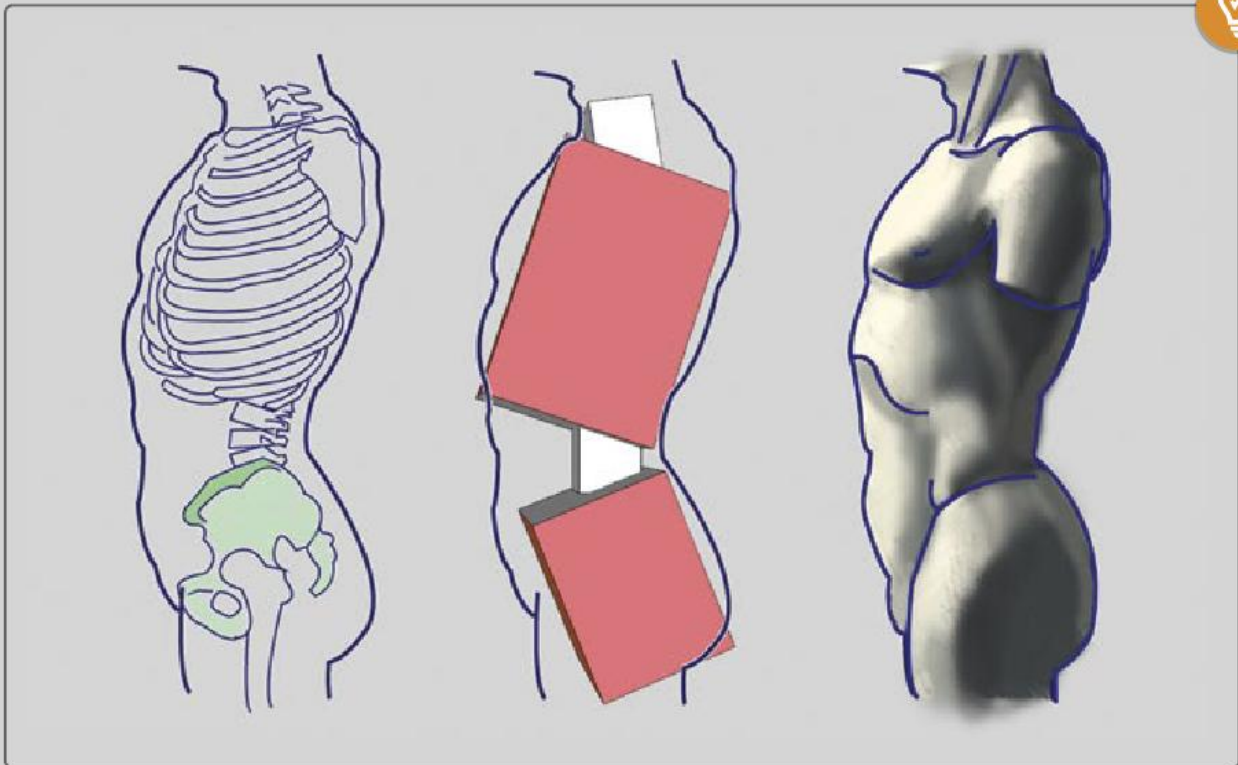
MUSCLES



REALISTIC

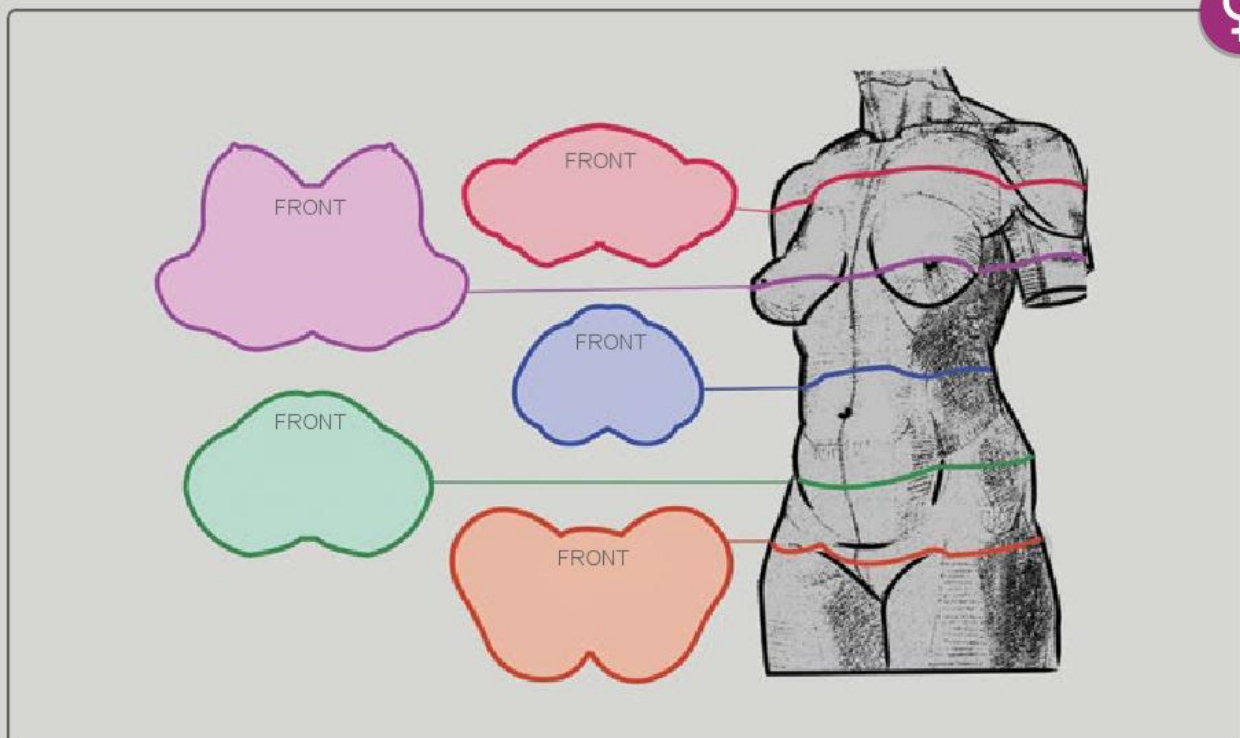
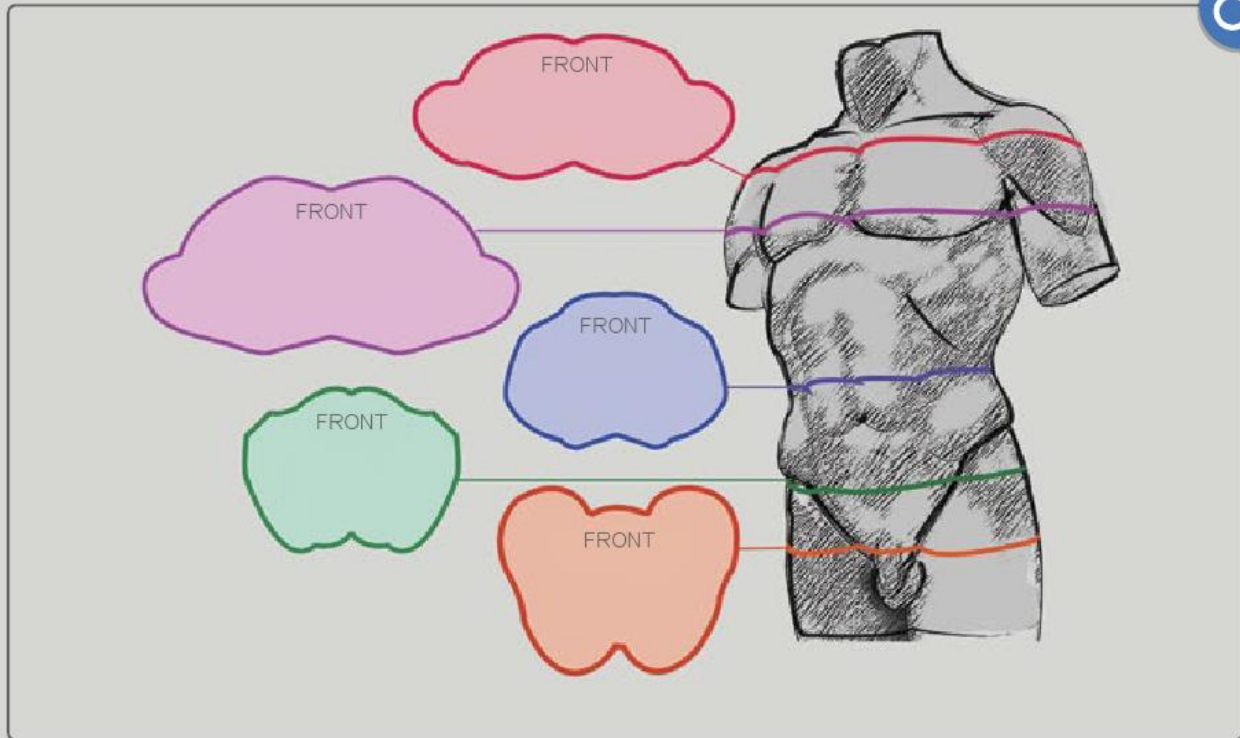


ANGULAR RELATIONSHIP OF MOVABLE MASSES OF TORSO

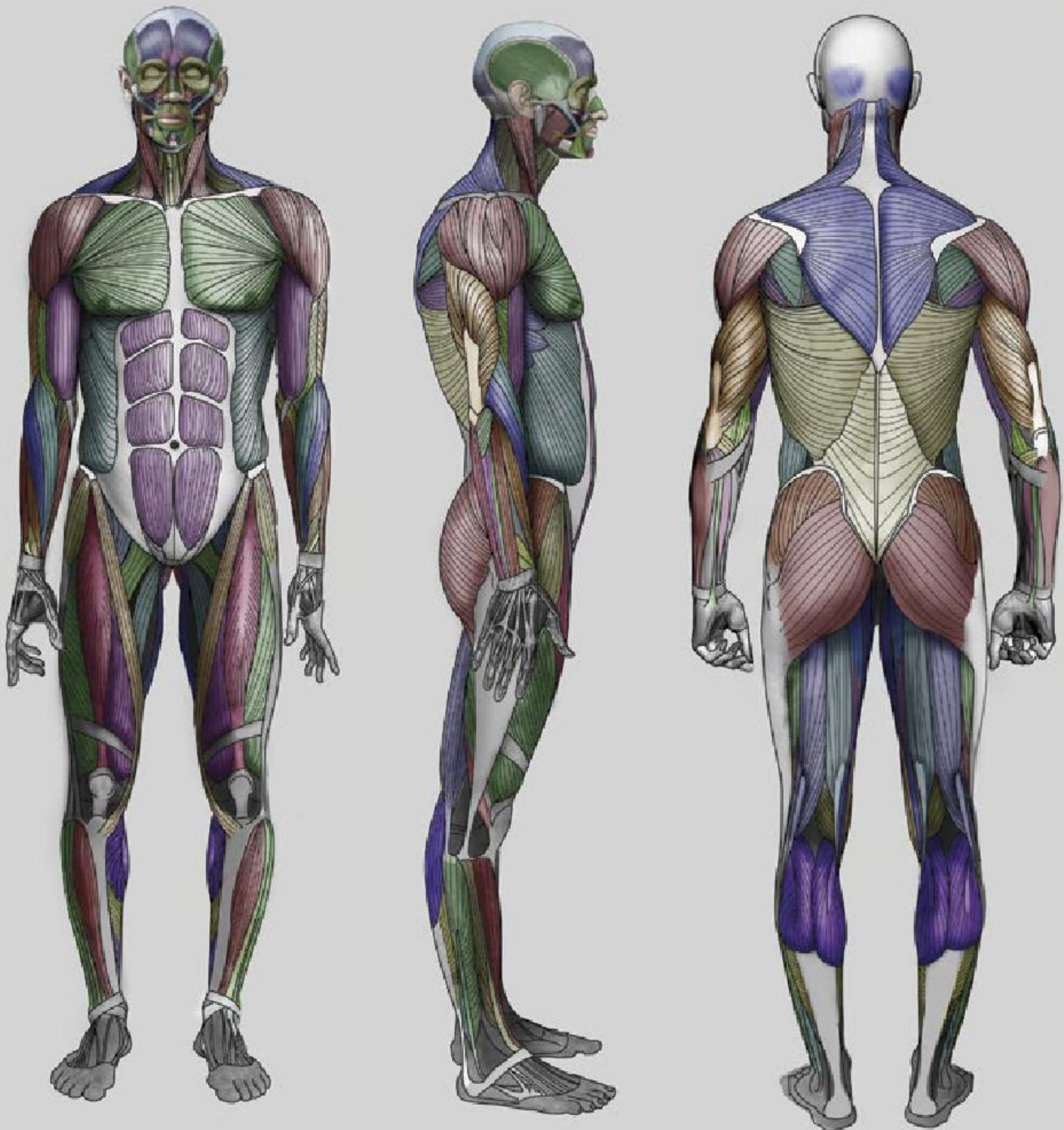


HORIZONTAL CROSS SECTIONS OF TORSO

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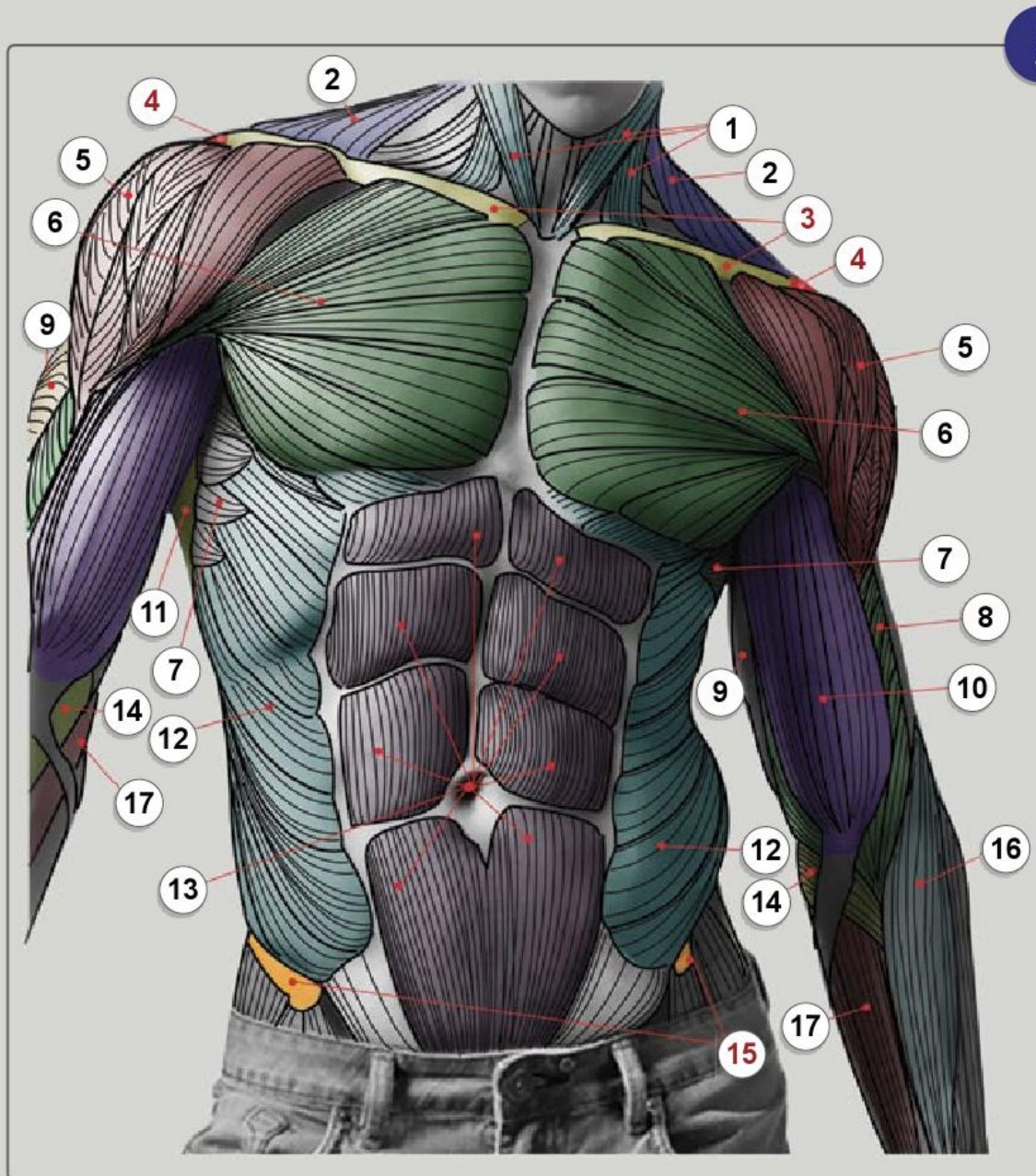
ÉCORCHÉ



MALE FIGURE

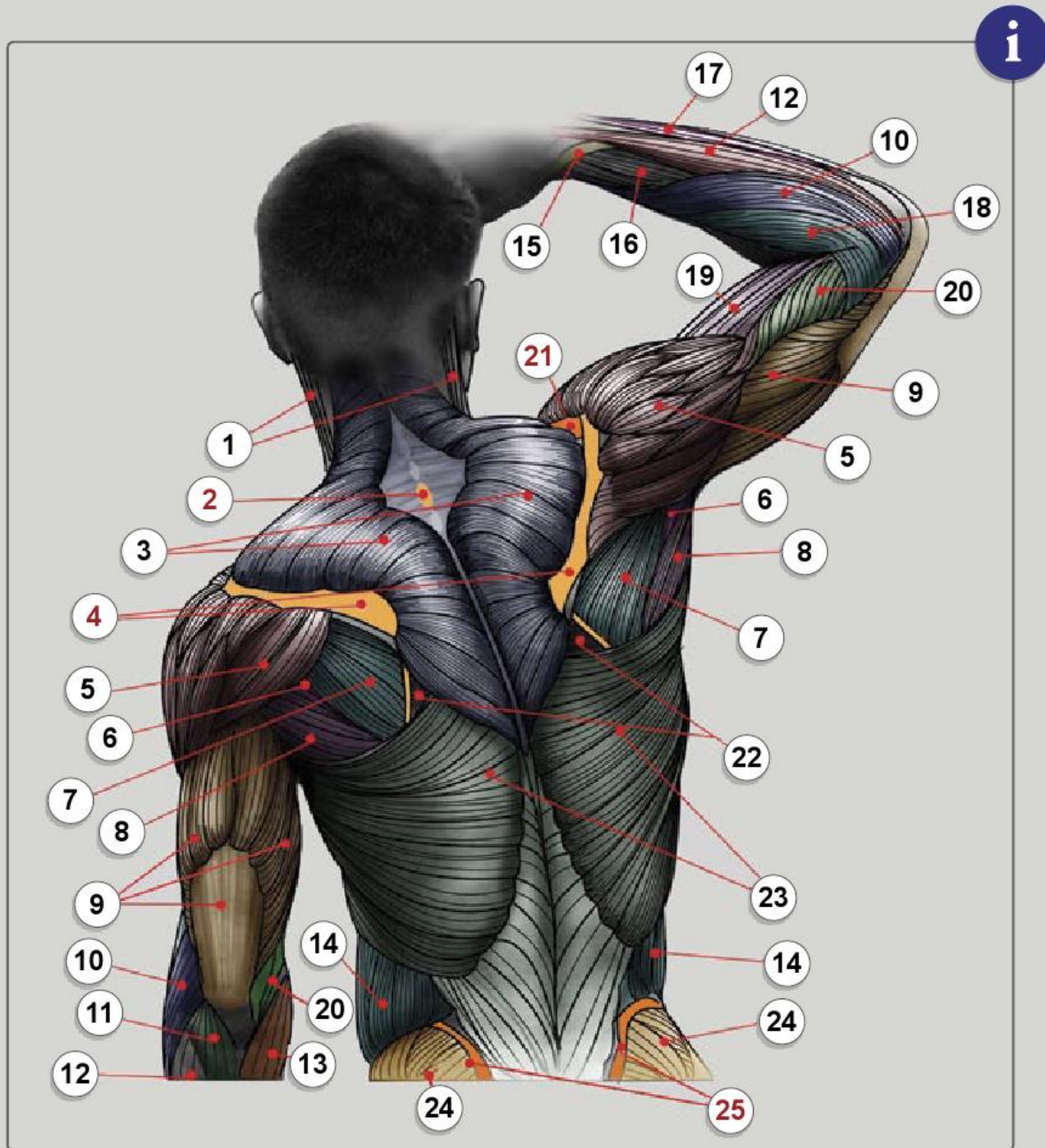


MAIN MUSCLES AND LANDMARK POINTS OF FRONTAL TORSO



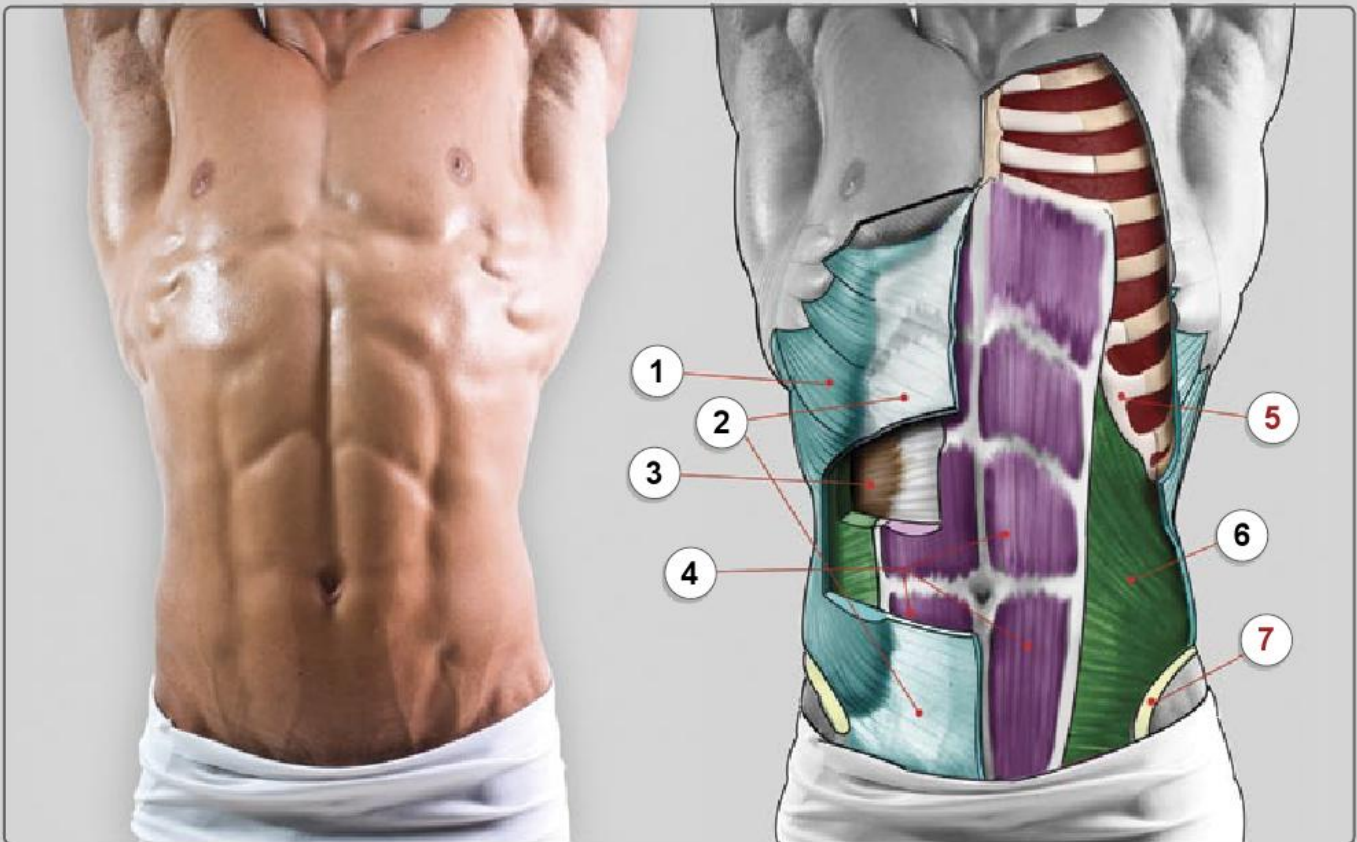
- | | | |
|-----------------------|---------------------|----------------------------------|
| 1 STERNOCLEIDOMASTOID | 7 SERRATUS ANTERIOR | 13 RECTUS ABDOMINIS |
| 2 TRAPEZIUS | 8 BRACHIALIS | 14 PRONATOR TERES |
| 3 CLAVICLE | 9 TRICEPS BRACHII | 15 ANTERIOR SUPERIOR ILIAC SPINE |
| 4 SHOULDER BLADE | 10 BICEPS BRACHII | 16 BRACHIORADIALIS |
| 5 DELTOID | 11 LATISSIMUS DORSI | 17 FLEXOR CARPI RADIALIS |
| 6 PECTORALIS | 12 EXTERNAL OBLIQUE | |

MAIN MUSCLES AND BONES OF THE BACK



1 STERNOCLEIDOMASTOID	10 EXTENSOR CARPI RADIALIS LONGUS	19 BICEPS BRACHII
2 7TH VERTEBRAE	11 ANCONEUS	20 BRACHIALIS
3 TRAPEZIUS	12 EXTENSOR DIGITORUM	21 CLAVICLE
4 SPINE OF SCAPULA	13 FLEXOR CARPI ULNARIS	22 RHOMBOID MAJOR
5 DELTOID	14 EXTERNAL OBLIQUE	23 LATISSIMUS DORSI
6 TERES MINOR	15 ABDUCTOR POLLICIS LONGUS	24 GLUTEUS MAXIMUS
7 INFRASPINATUS	16 EXTENSOR CARPI RADIALIS BREVIS	25 POSTERIOR SUPERIOR ILIAC SPINE
8 TERES MAJOR	17 EXTENSOR CARPI ULNARIS	
9 TRICEPS BRACHII	18 BRACHIORADIALIS	

ABDOMINAL MUSCLES



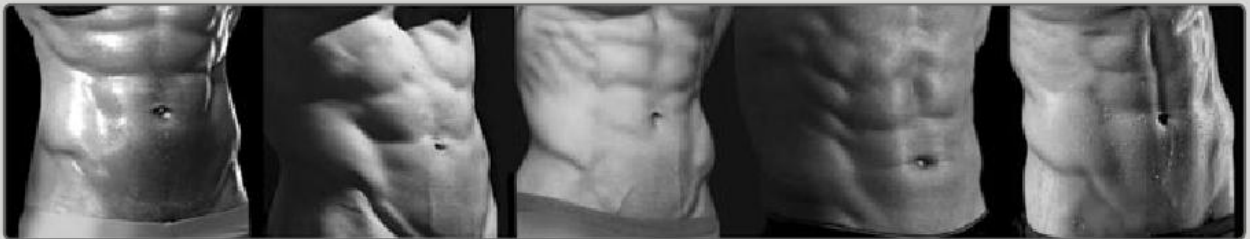
i

- 1 **EXTERNAL OBLIQUE:** LOCATED ON SIDE AND FRONT OF ABDOMEN
- 2 **APONEUROSIS OF EXTERNAL OBLIQUE:**
BROAD, FLAT, TENDINOUS PORTION OF **EXTERNAL OBLIQUE** MUSCLE
- 3 **TRANSVERSUS ABDOMINIS:** LOCATED UNDER **OBLIQUES**, IT IS THE DEEPEST OF ABDOMINAL MUSCLES AND WRAPS AROUND SPINE FOR PROTECTION AND STABILITY
- 4 **RECTUS ABDOMINIS:** ALSO KNOWN AS “**ABS**” OR **SIX-PACK** – LOCATED ALONG FRONT OF THE ABDOMEN. THIS IS THE MOST WELL-KNOWN ABDOMINAL MUSCLE
- 5 **RIB CAGE** (THORACIC CAGE OR THORAX)
- 6 **INTERNAL ABDOMINAL OBLIQUE:** LOCATED UNDER **EXTERNAL OBLIQUES** AND RUNS IN THE OPPOSITE DIRECTION
- 7 **WING OF ILIUM** – COMMONLY CALLED “**HIP BONE**” (ILIAC CREST)

IS A “SIX-PACK” REALLY AN “EIGHT-PACK”?



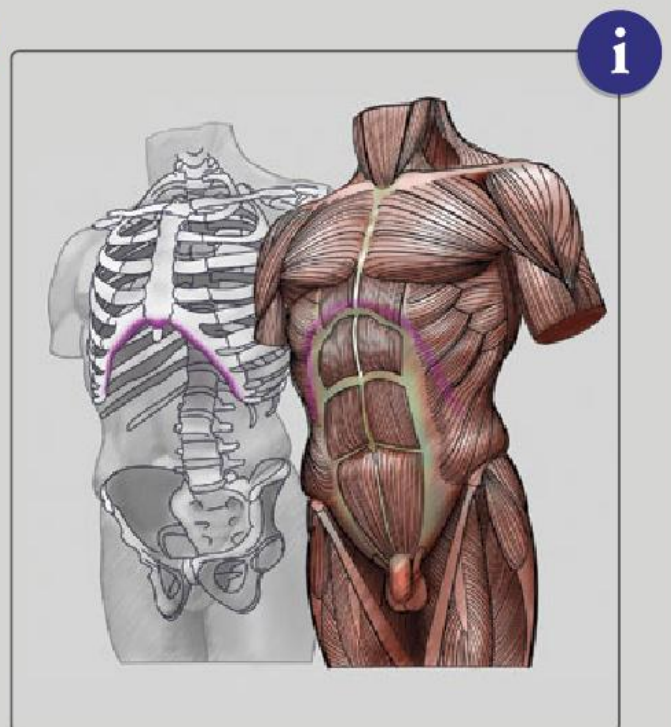
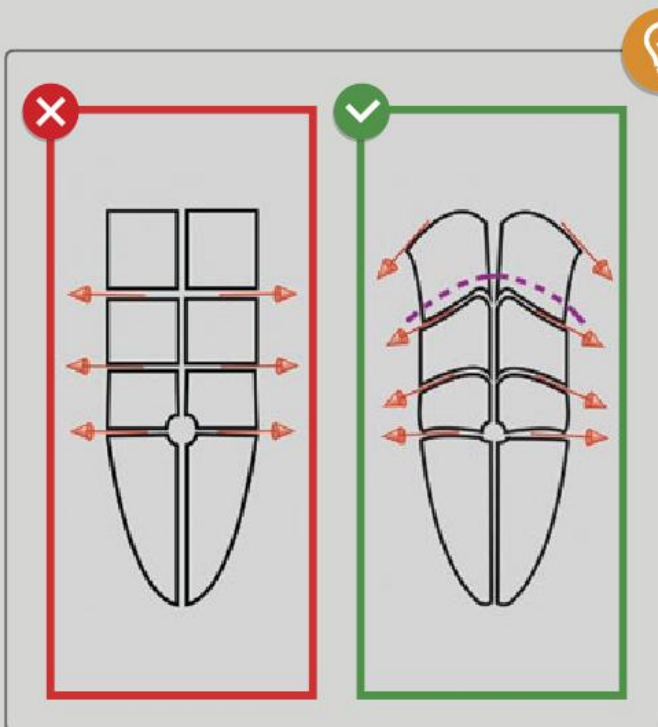
CLASSIC SCULPTURE



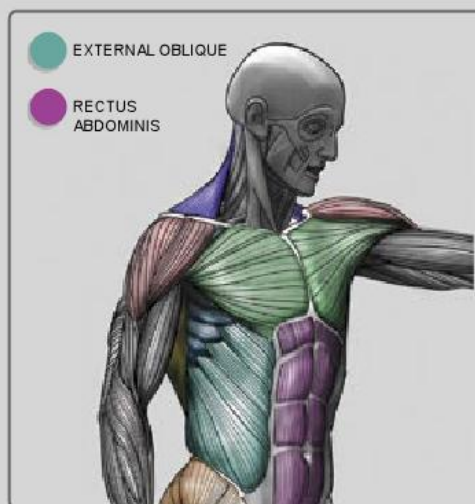
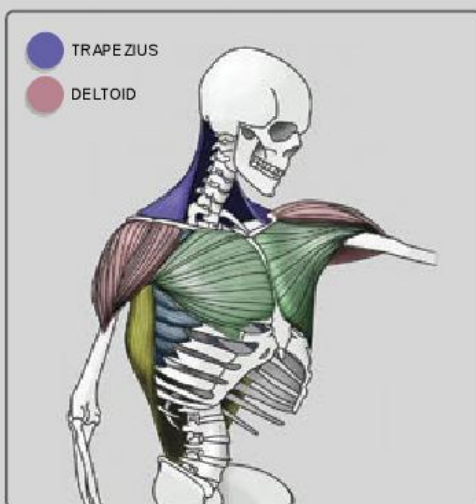
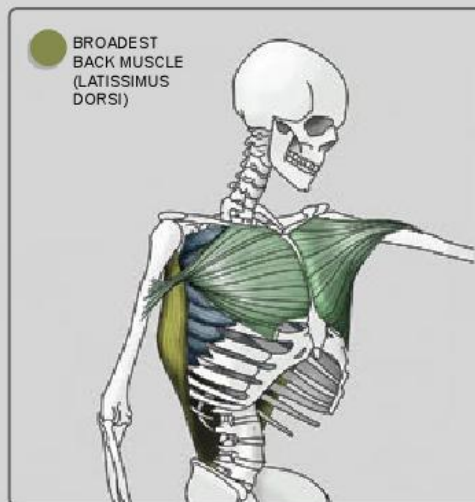
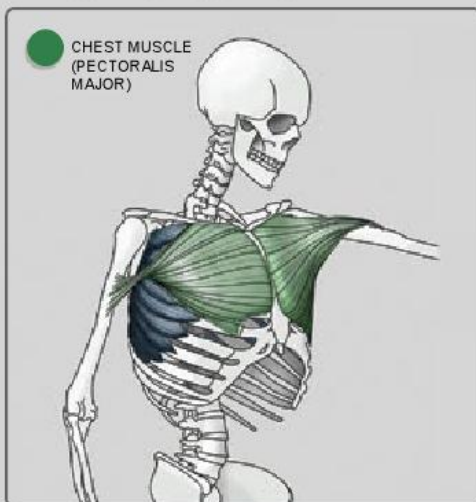
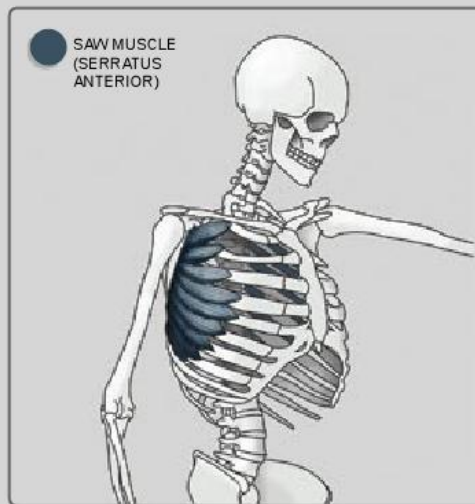
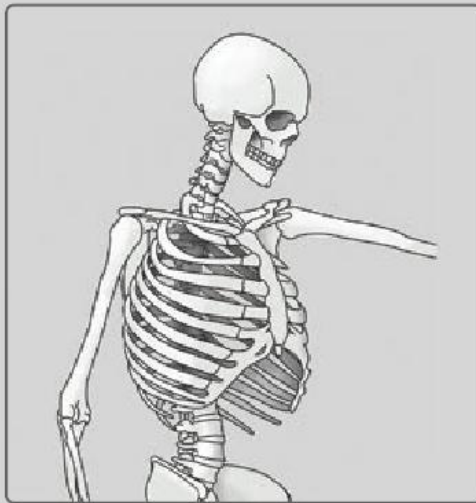
FITNESS



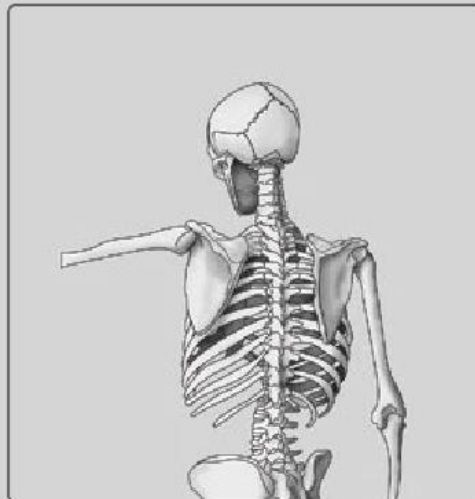
SKINLESS



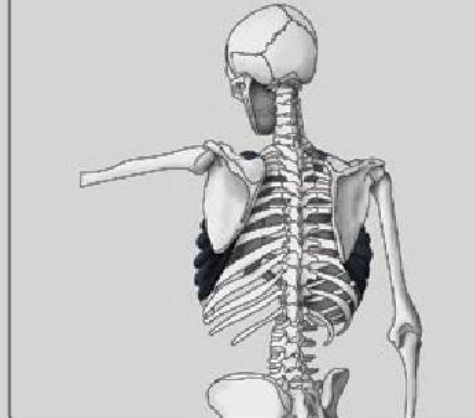
MOST IMPORTANT MUSCLES OF FRONTAL TORSO (LAYER BY LAYER)



MOST IMPORTANT BACK MUSCLES (LAYER BY LAYER)



SAW MUSCLE
(SERRATUS ANTERIOR)

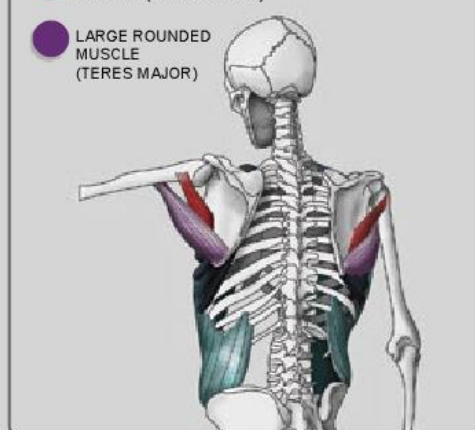


EXTERNAL OBLIQUE



SMALL ROUNDED
MUSCLE (TERES MINOR)

LARGE ROUNDED
MUSCLE
(TERES MAJOR)

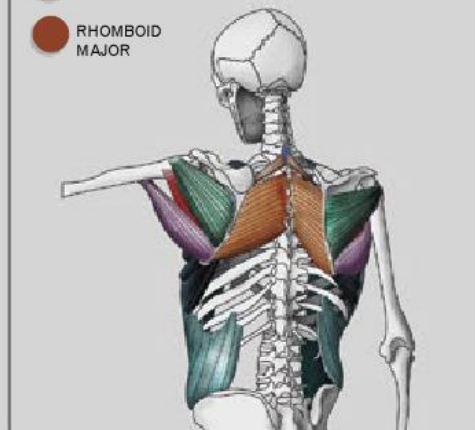


INFRASPINATUS



RHOMBOID MINOR

RHOMBOID
MAJOR



MOST IMPORTANT BACK MUSCLES (LAYER BY LAYER)

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**BROADEST
BACK MUSCLE
(LATISSIMUS DORSI)**



TRAPEZIUS



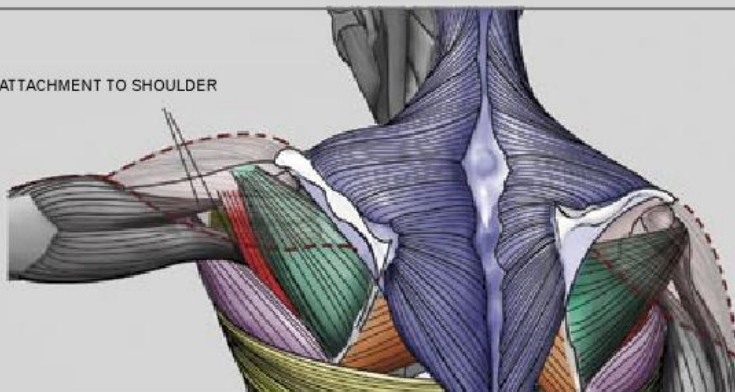
DELTOID



**BUTTOCKS
(GLUTEUS MAXIMUS)**

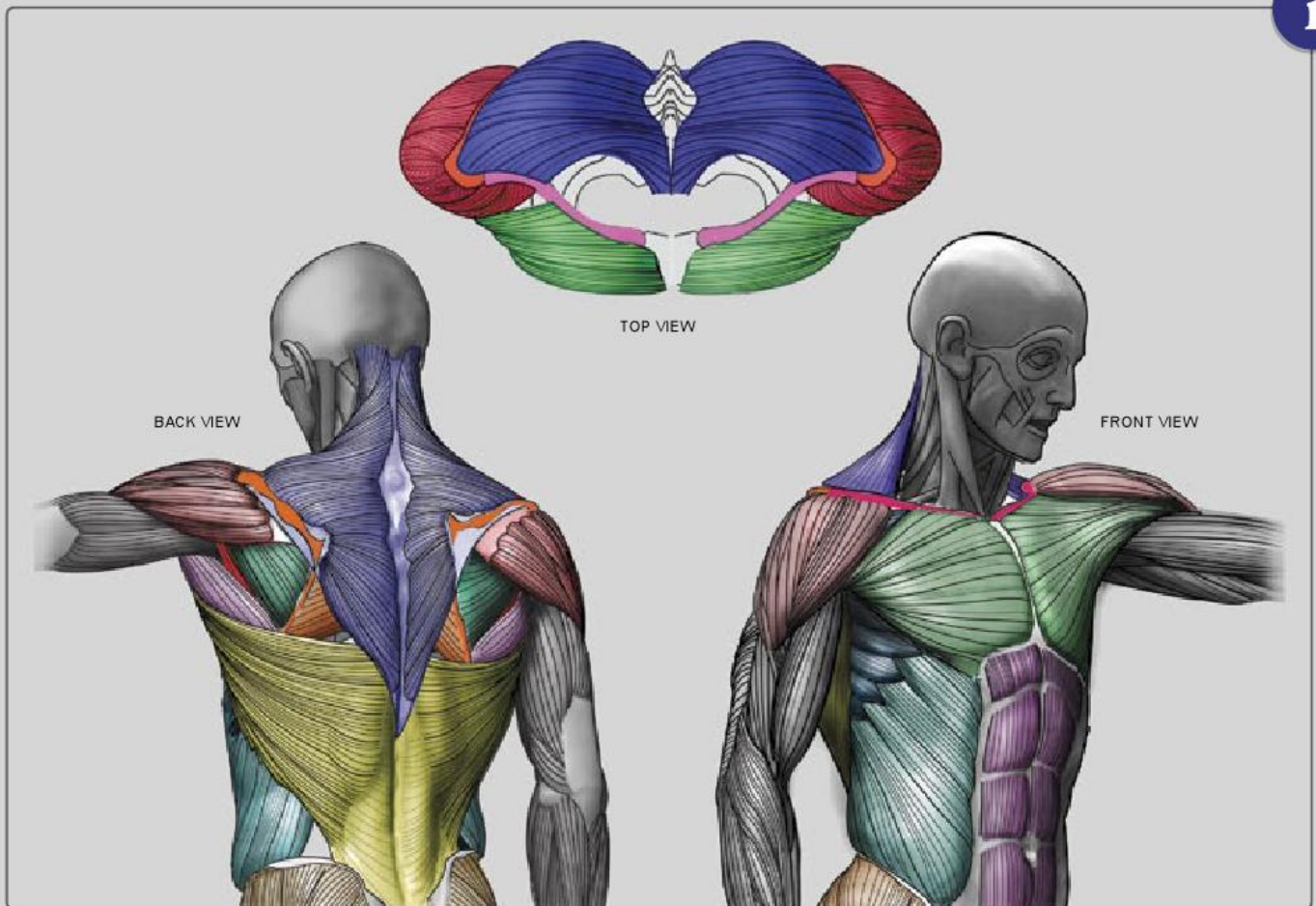


TRICEPS ATTACHMENT TO SHOULDER

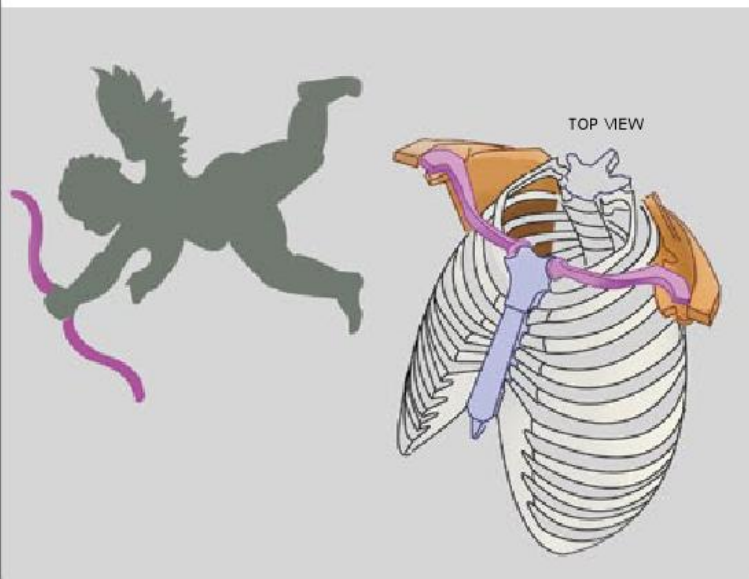


CLAVICLE – SHAPE AND CONNECTIONS

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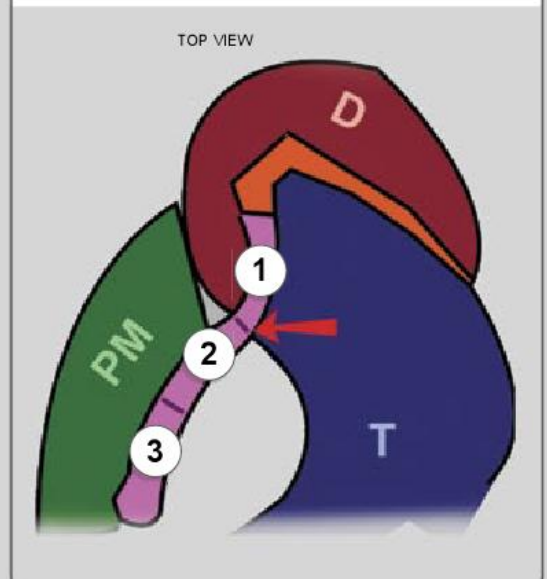


IF YOU LOOK AT THE **CLAVICLE** FROM ABOVE, YOU CAN SEE IT'S AN "S" SHAPE.



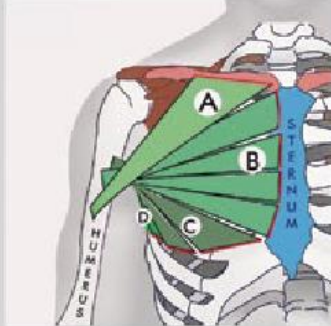
BOTH, **(D)** AND **(T)** CONNECT ON THE LATERAL THIRD OF THE **CLAVICLE**.

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GREAT CHEST MUSCLE

(PECTORALIS MAJOR)



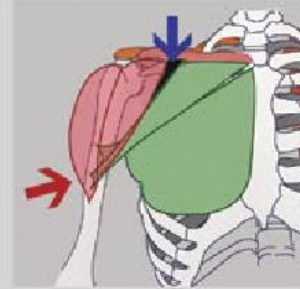
ONE END OF **PM** IS CONNECTED TO THE HUMERUS AND OTHER END CONNECTS:

- A:** TO 3/5 OF **CLAVICLE**
- B:** TO **STERNUM** BONE
- C:** TO **RIBS**
- D:** LYING ON ABDOMINAL MUSCLES

A: THIS PORTION IS OFTEN VISIBLE AS SEPARATE PART OF **PM**.

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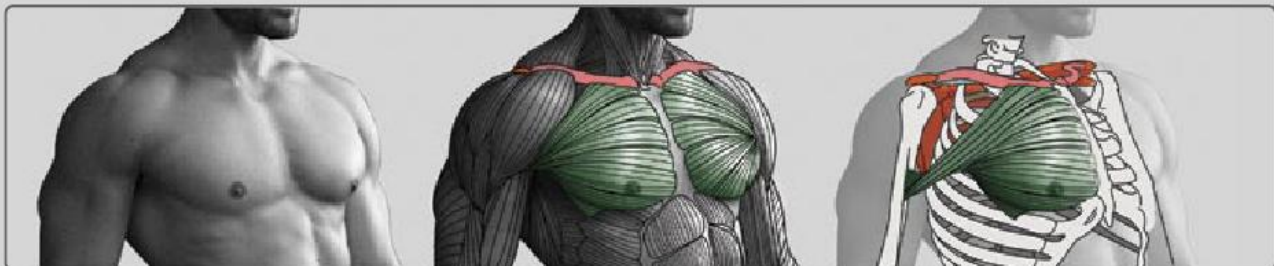
HOLLOW AREA BETWEEN **PM** AND **DELTOID** IS ALWAYS VISIBLE!



PM IS PARTIALLY COVERED BY **DELTOID** MUSCLE.

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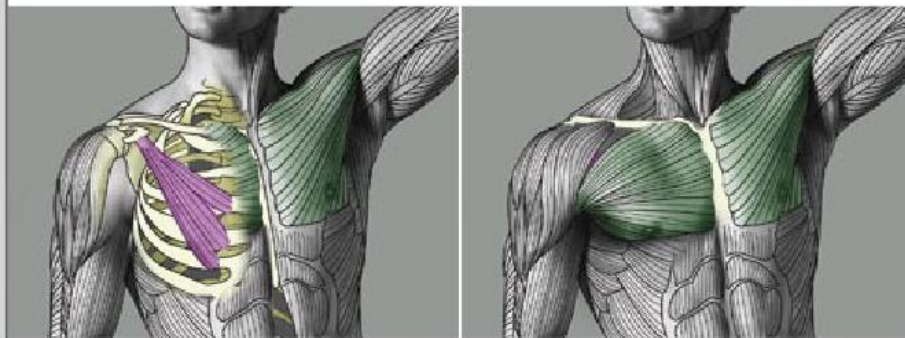
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WHAT IS THIS BULGE?

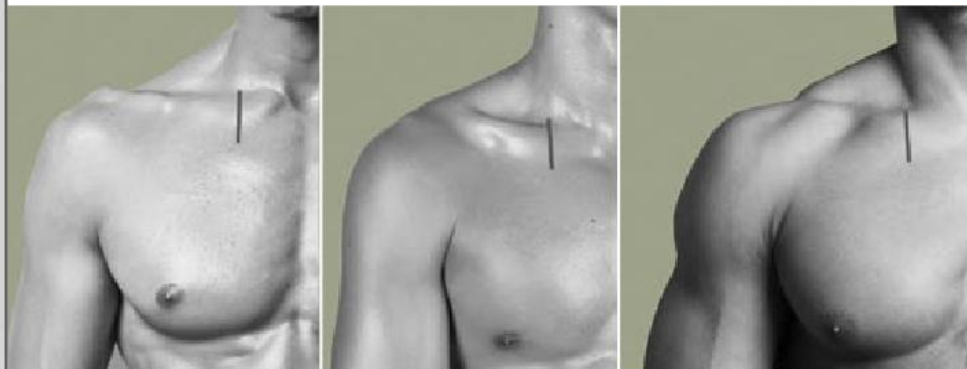


THE **PECTORALIS MINOR** MUSCLE PUSHING **PECTORALIS MAJOR** OUTWARD FROM UNDERNEATH.



ORIGIN: STERNUM ENDS AT 3-5 RIBS
INSERTION: CORACOID PROCESS OF SCAPULA
ACTION: MOVES SHOULDER BLADE FORWARD AND DOWNWARD

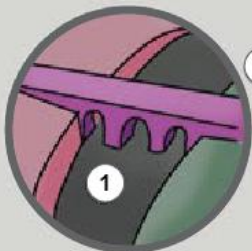
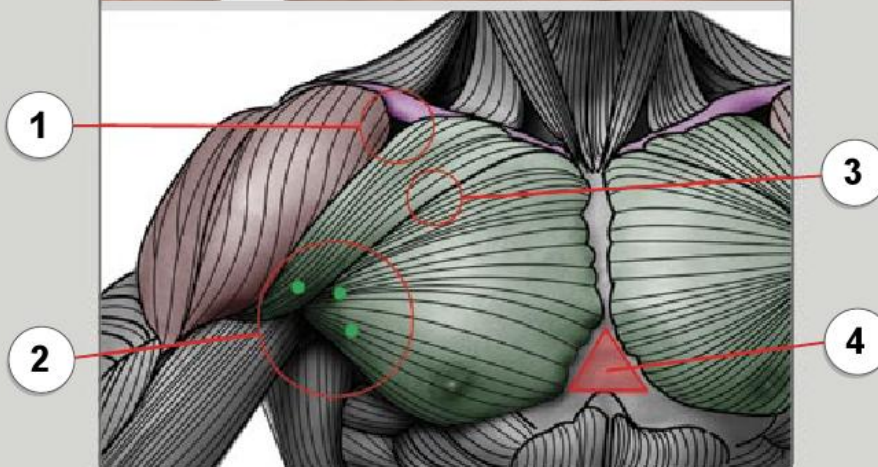
AS **CHEST MUSCLES** BECOME MORE DEVELOPED, LESS **COLLAR BONE (CLAVICLE)** IS VISIBLE.



CROSS SECTION OF **COLLAR BONE (CLAVICLE)** AND **CHEST MUSCLE (PECTORALIS MAJOR)**.



CHEST AND SHOULDER FEATURES



- 1 **COLLARBONE (CLAVICLE)** IS LIKE A BRIDGE OVER A VALLEY. UNDERNEATH THE COLLARBONE IS THE **INFRACLAVICULAR TRIANGLE (INFRACLAVICULAR FOSSA)**, WHICH IS A PIT BETWEEN **THE CHEST MUSCLE (PECTORALIS MAJOR)** AND **SHOULDER MUSCLE (DELTOID)**. THE **COLLARBONE (CLAVICLE)** IS ALWAYS VISIBLE.

- 2 EACH BODY ●●● OF **THE CHEST MUSCLE (PECTORALIS MAJOR)** HAS DIFFERENT INSERTIONS ON **THE HUMERUS**. FIBERS CHANGE DIRECTIONS, CROSSING OVER EACH OTHER AND CREATING **MULTIPLE MASSES ON THE EDGE OF THE ARMPIT**.

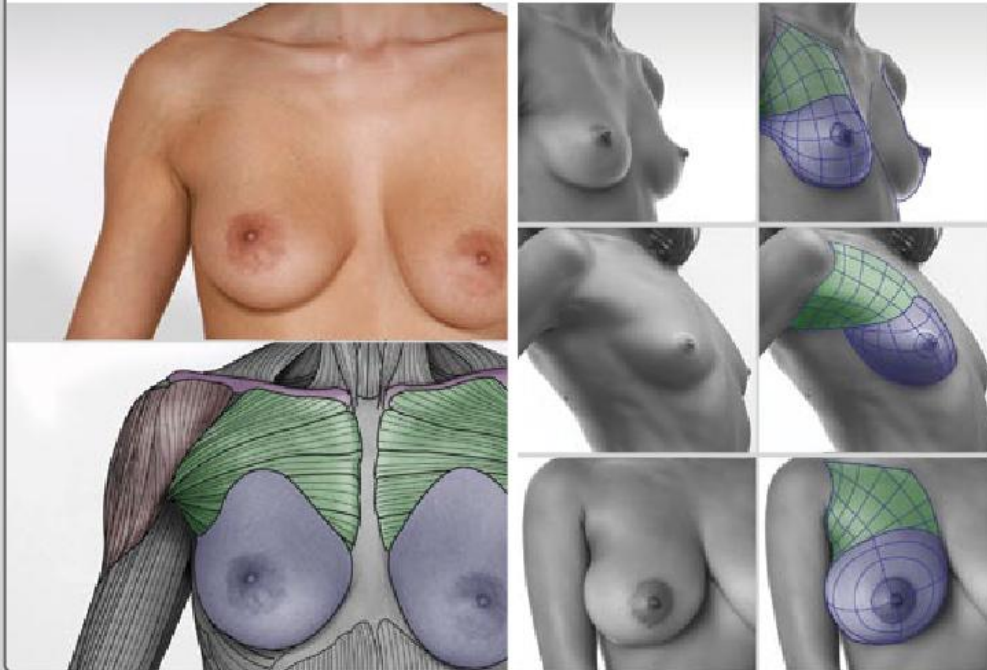
- 3 SOMETIMES IN VERY MUSCULAR INDIVIDUALS, YOU CAN SEE A SEPARATION BETWEEN THE **CLAVICULAR SECTION** AND **STERNAL SECTION** OF THE **CHEST MUSCLE (PECTORALIS MAJOR)**.

- 4 **BONY TRIANGLE** BETWEEN **CHEST MUSCLES** AND **ABDOMINAL SIX-PACK**.

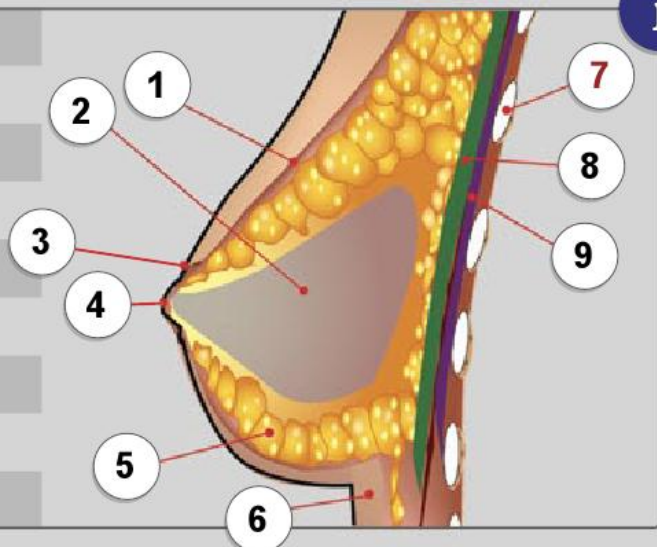


FEMALE BREAST

IMAGINING THE SEPARATION BETWEEN **BREASTS** AND **PECTORAL MUSCLES** MAY HELP YOU SCULPT THEM CORRECTLY.

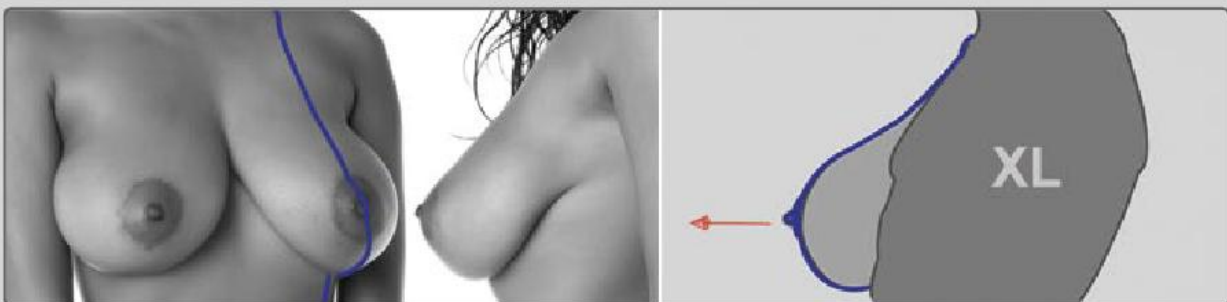
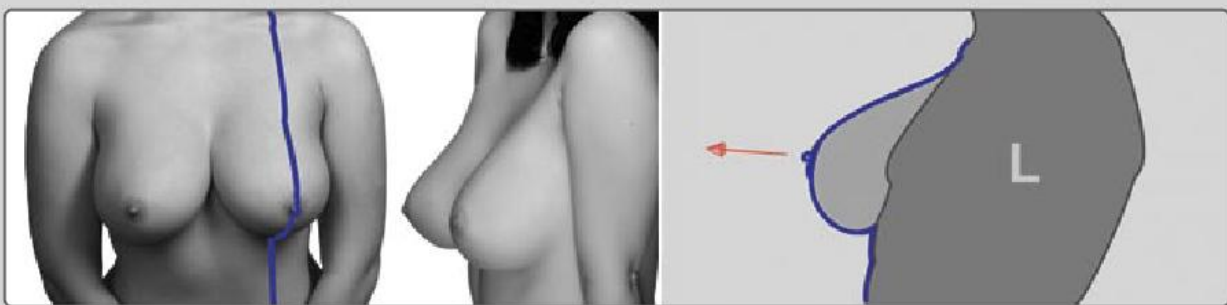
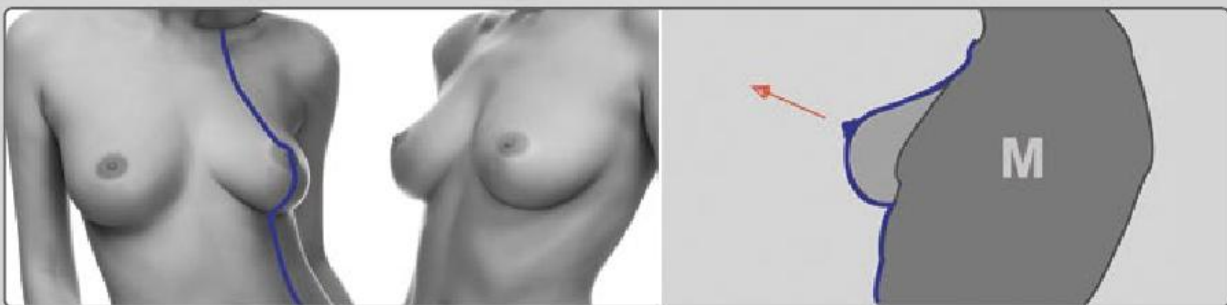


- 1 SUBCUTANEOUS FAT PAD
- 2 LOBULES
- 3 AREOLA
- 4 NIPPLE
- 5 PECTORAL FAT PAD
- 6 SKIN
- 7 RIBS
- 8 PECTORALIS MAJOR
- 9 PECTORALIS MINOR



FEMALE BREAST ANGLES VARY DEPENDING ON SHAPE AND SIZE

i



BREAST VOLUME AND POSITIONING

ALTHOUGH THE SHAPE CHANGES, VOLUME REMAINS CONSTANT.



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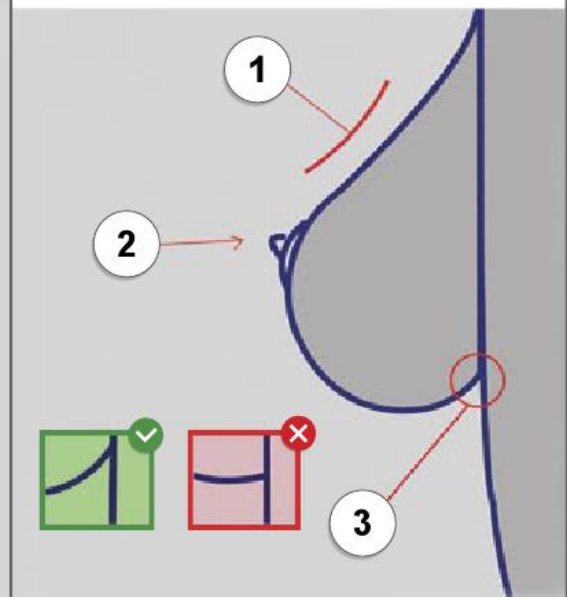


THE LARGER THE BREASTS, THE MORE THEY ARE SHAPED BY GRAVITY WHEN A WOMAN IS LYING ON HER BACK.



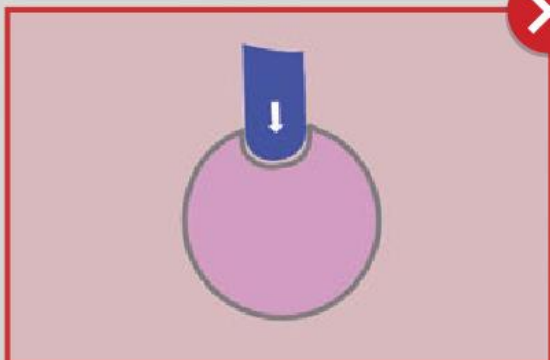
💡

3 TIPS ON HOW TO MAKE FEMALE BREASTS LOOK YOUTHFUL.

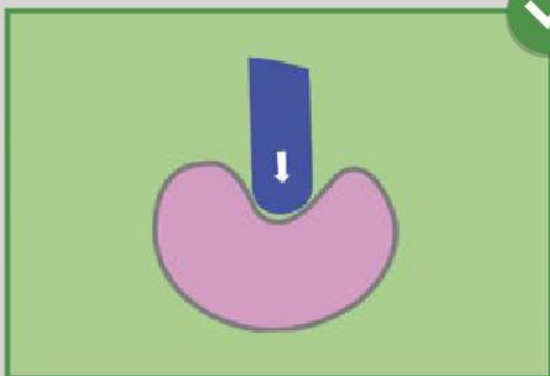


- 1 TOP SIDE: STRAIGHT OR CONCAVE, BUT NEVER CONVEX
- 2 NIPPLE POINTS UPWARD
- 3 LIFT LOWER BORDER WHERE BREAST CONNECTS TO CHEST WALL

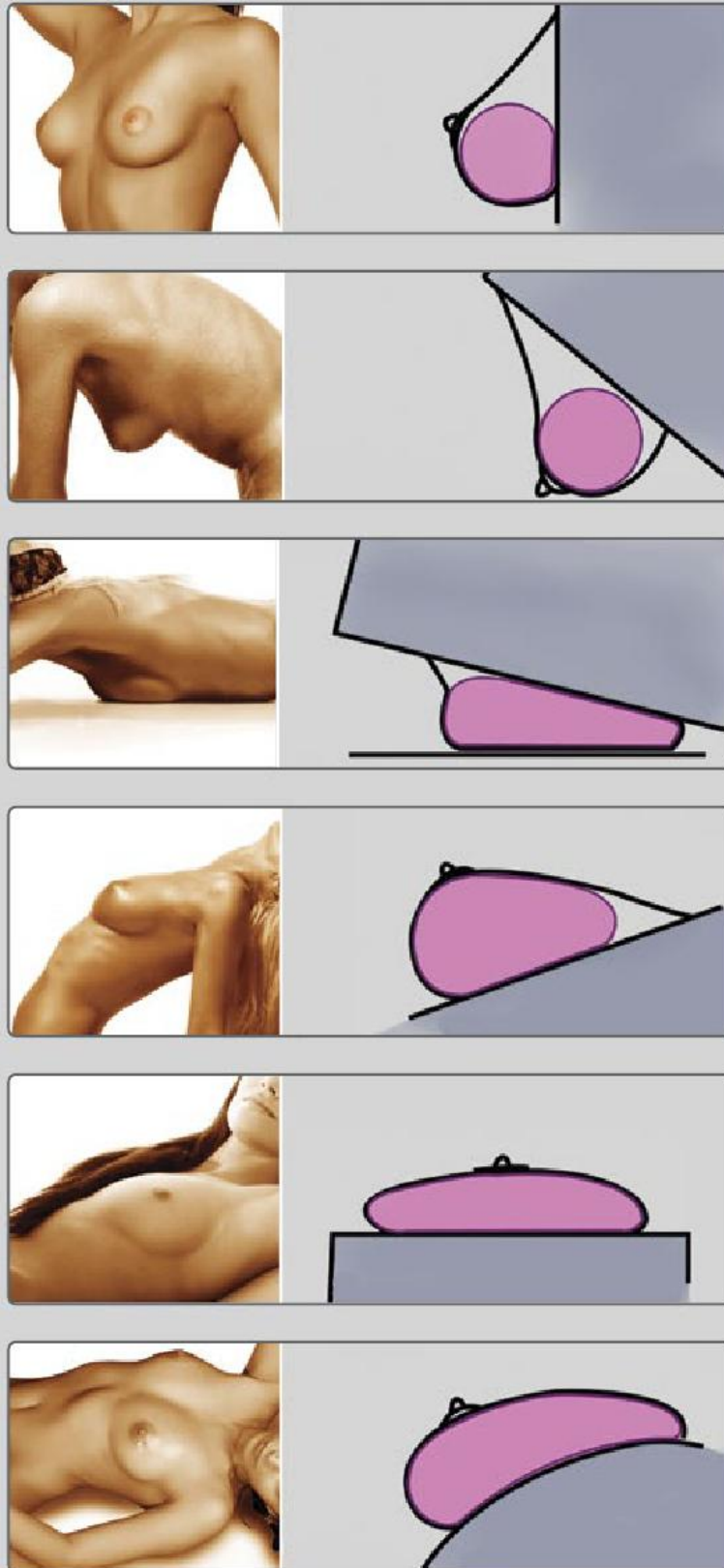
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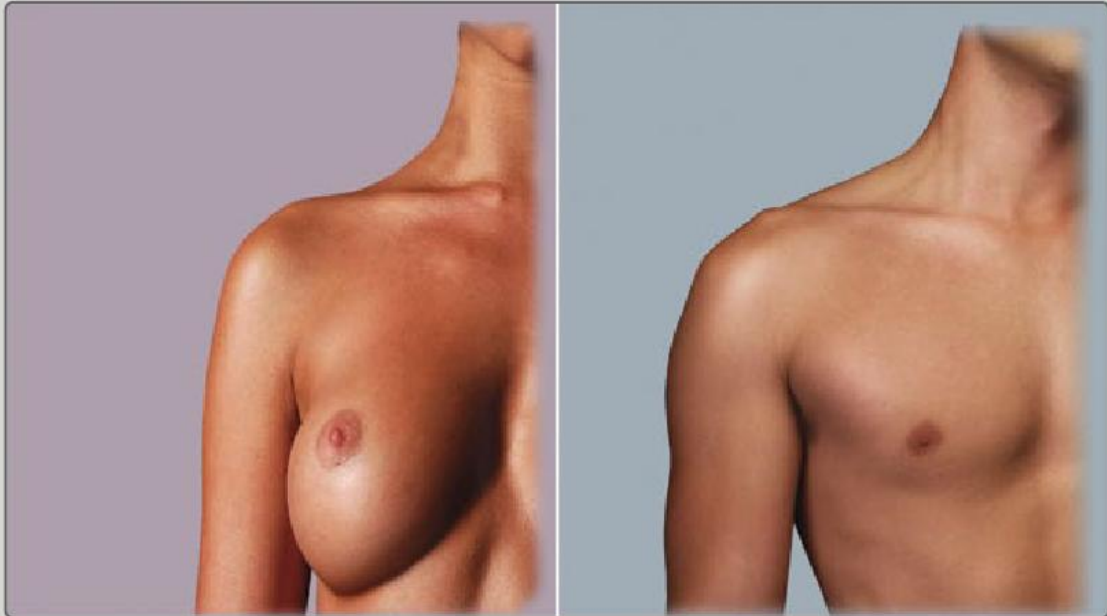
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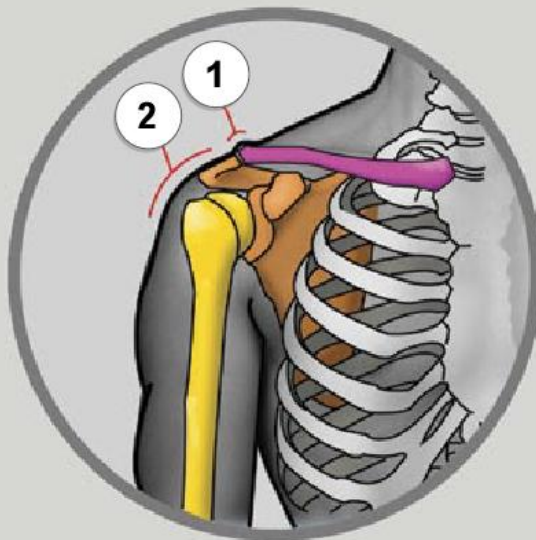
WEIGHT AND MASS DISTRIBUTION OF FEMALE BREAST



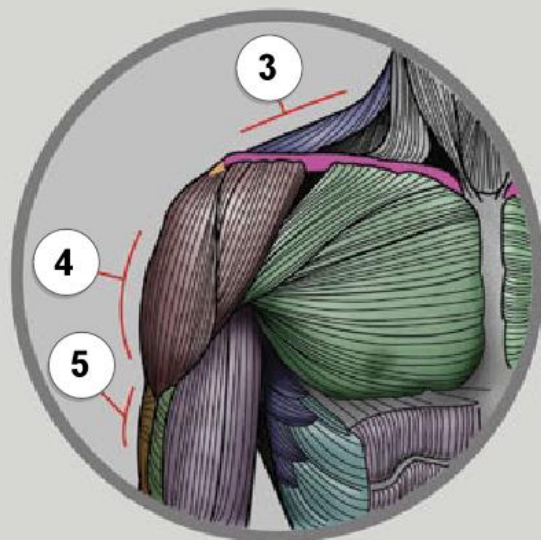
WHAT CREATES A SHOULDER'S SILHOUETTE?



BONES

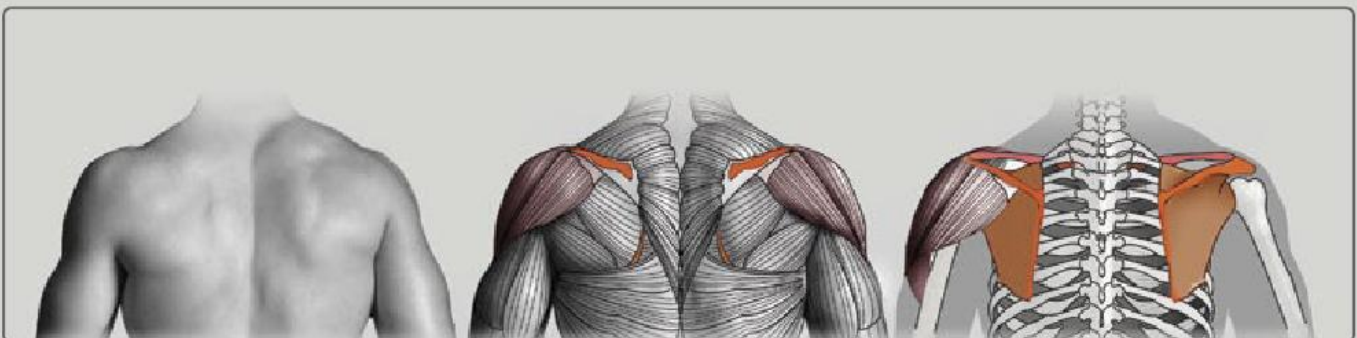
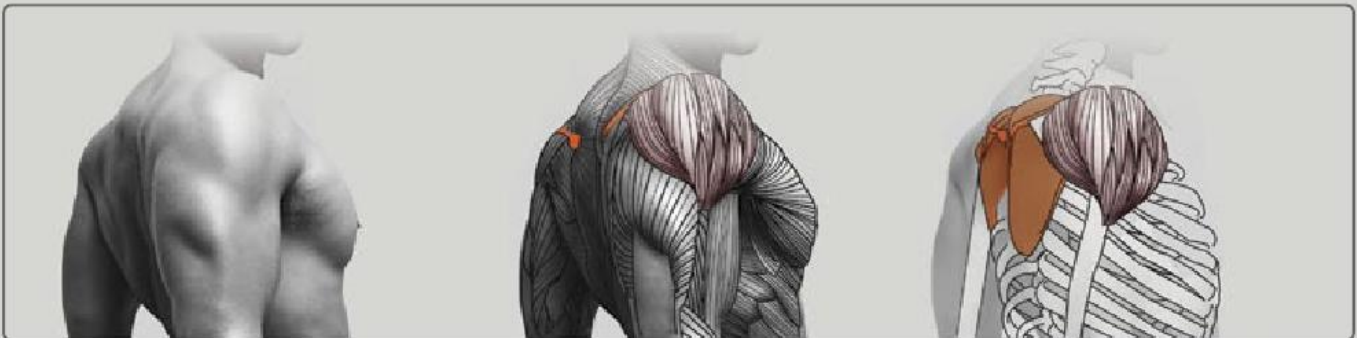
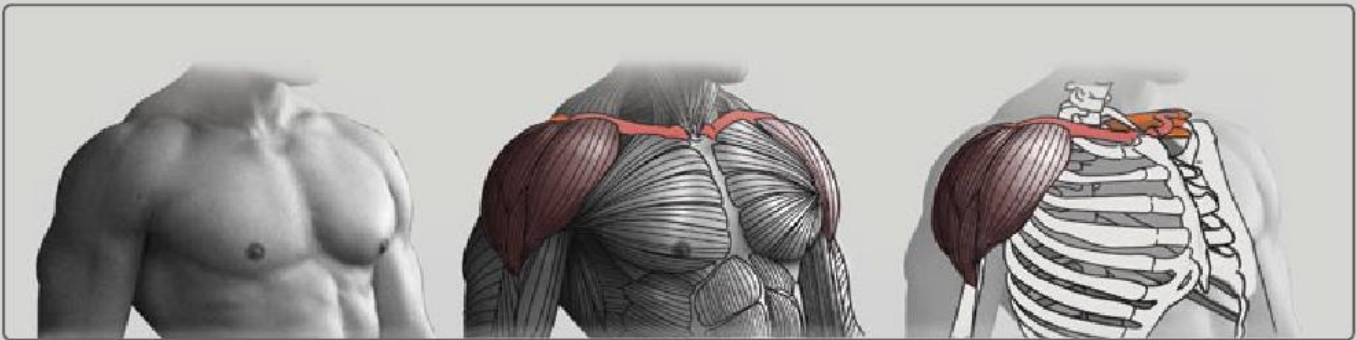
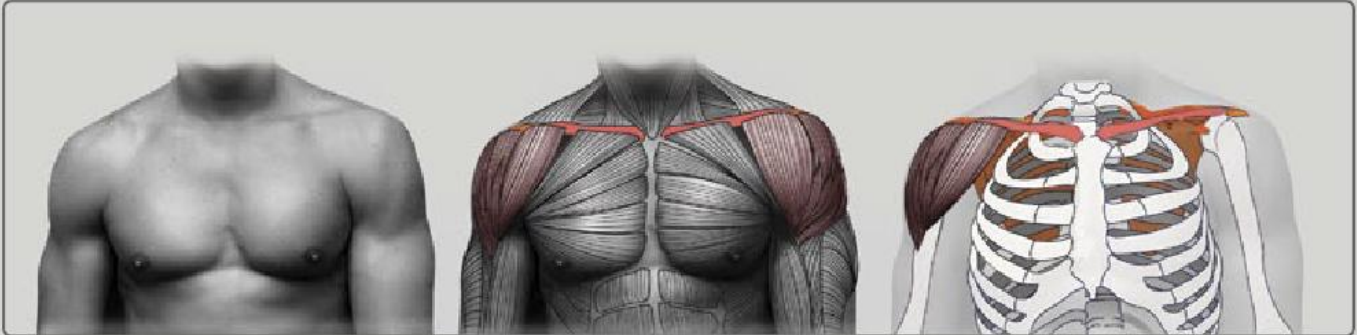


MUSCLES



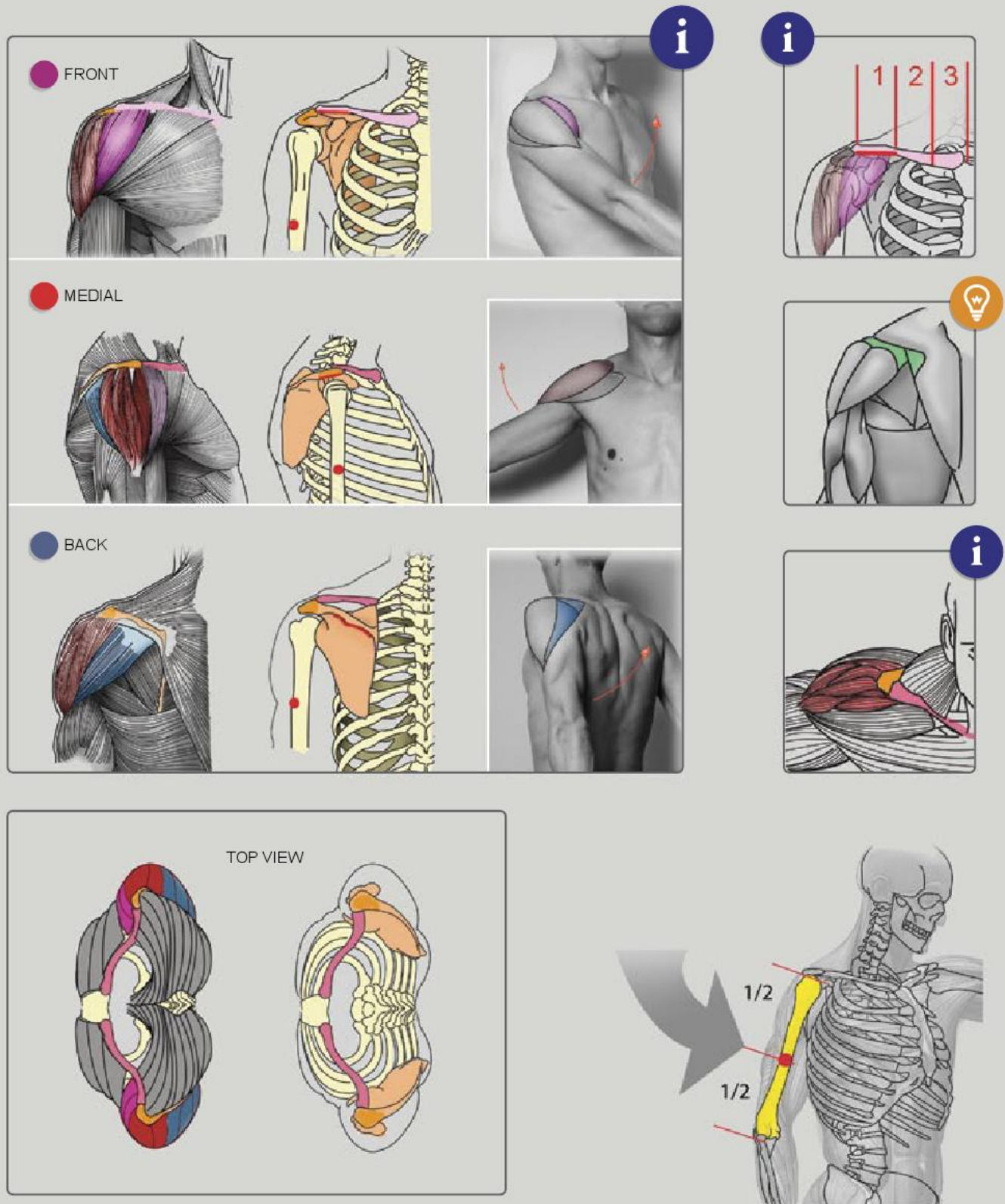
- ① LATERAL END OF **CLAVICLE**
- ② HEAD OF **HUMERUS** PUSHES **SHOULDER MUSCLE (DELTOID)** OUTWARD.
- ③ **TRAPEZIUS**
- ④ LATERAL HEAD OF **SHOULDER MUSCLE (DELTOID)**
- ⑤ LATERAL HEAD OF **TRICEPS**

SHOULDER MUSCLE (DELTOID)

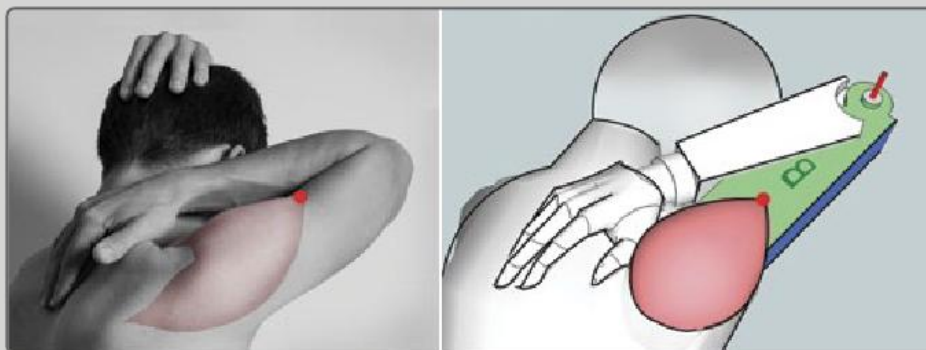
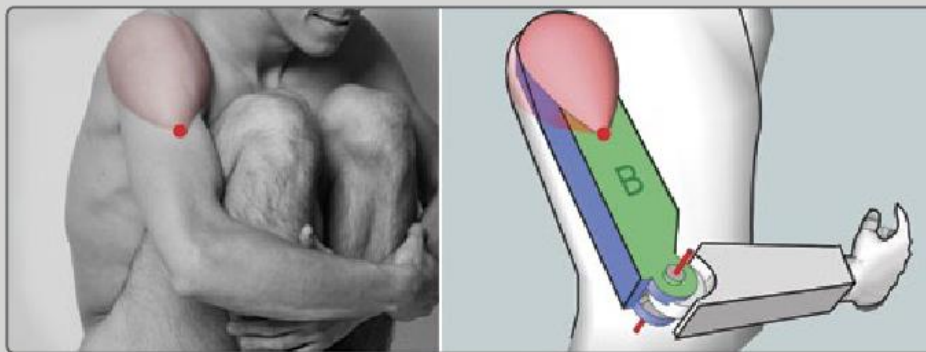
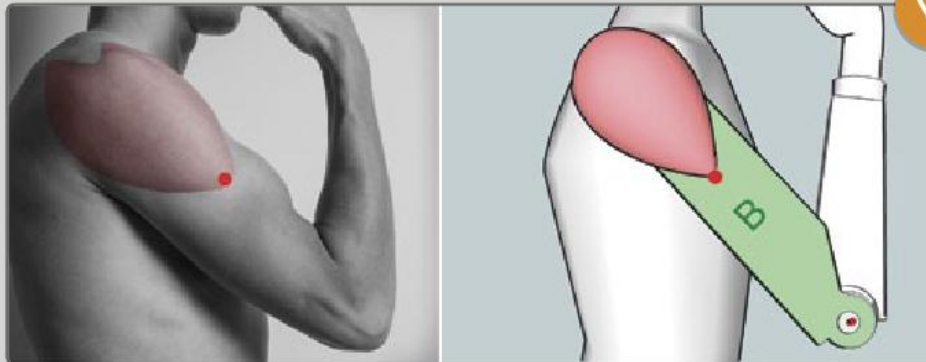


SHOULDER MUSCLE (DELTOID) HAS 3 SECTIONS:

FRONT (ANTERIOR PART), MEDIAL (LATERAL PART) AND BACK (POSTERIOR PART)



WHICHEVER WAY YOU TURN YOUR ARM, **THE DELTOID'S LOWER, TAPERED END** IS ALWAYS ON THE **"B" SURFACE!**

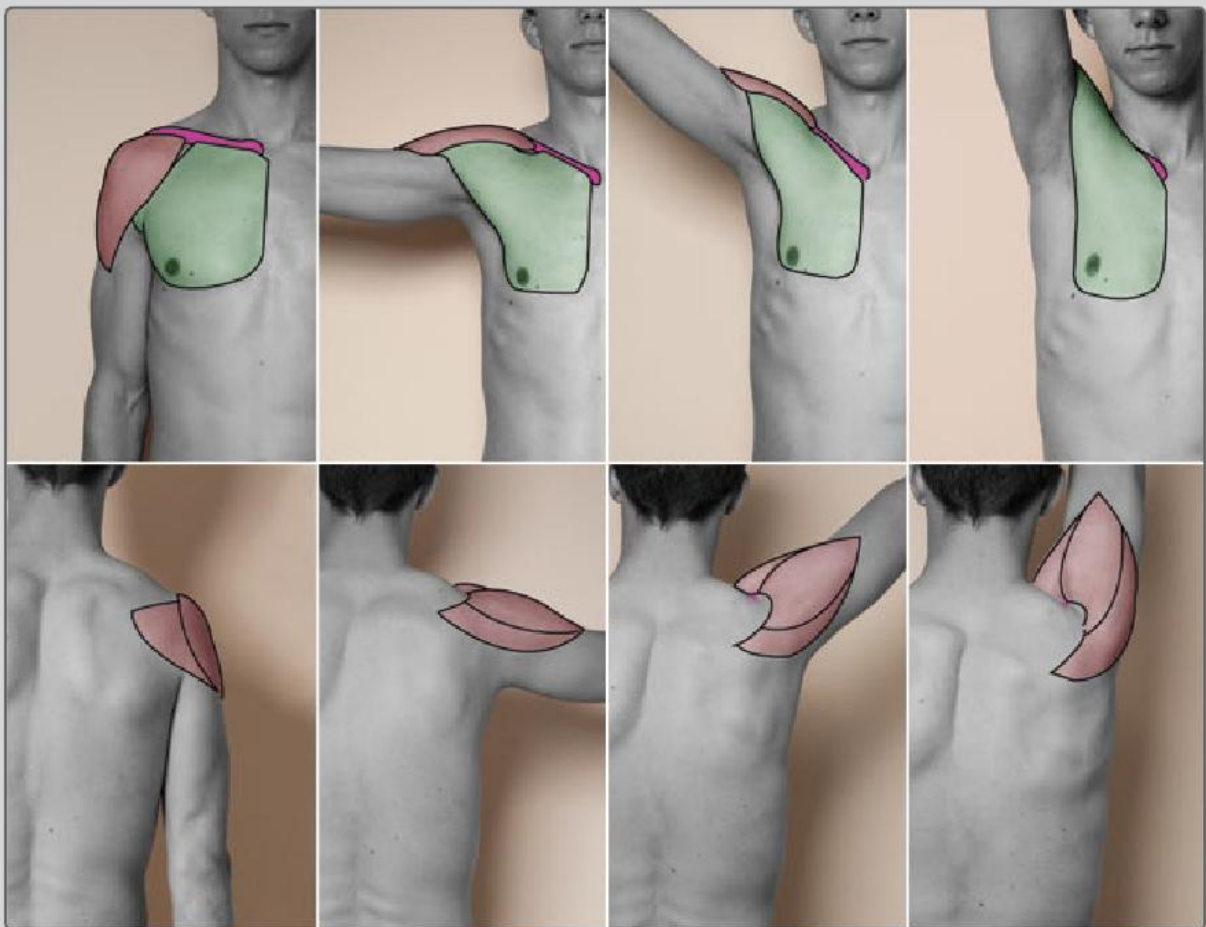
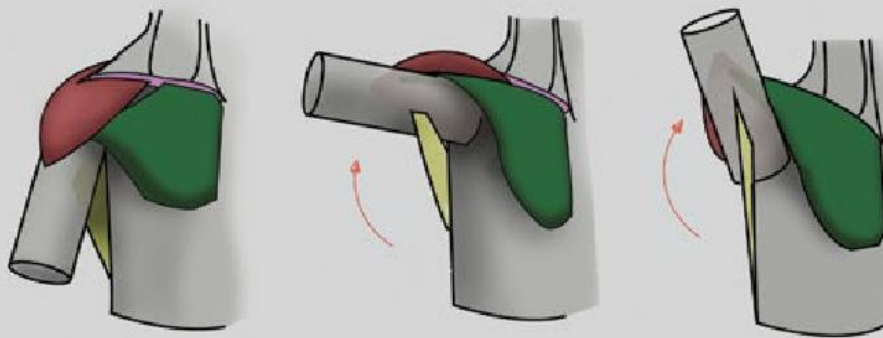


WHERE DOES IT GO?



WHERE DOES **THE SHOULDER MUSCLE (DELTOID)** DISAPPEAR TO WHEN THE ARM IS LIFTED UP? IT JUST TURNS TOWARD THE BACK AND YOU WILL SEE IT IF YOU LOOK FROM THE OTHER SIDE.

THE CLAVICLE IS ONLY COVERED BY SKIN. IT IS ALWAYS VISIBLE EXCEPT WHEN ARMS ARE LIFTED. THEN, **THE CLAVICLE** IS HIDDEN BEHIND **THE GREAT CHEST MUSCLE (PECTORALIS MAJOR)**.



TRAPEZIUS MUSCLE

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ORIGIN: MEDIAL SUPERIOR NUCHAL LINE & EXTERNAL PROTUBERANCE OF THE SKULL

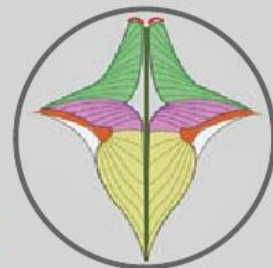
INSERTION: LATERAL CLAVICLE, ACROMION AND SPINE OF SCAPULA

ACTIONS:

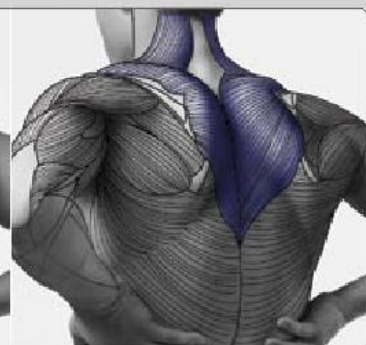
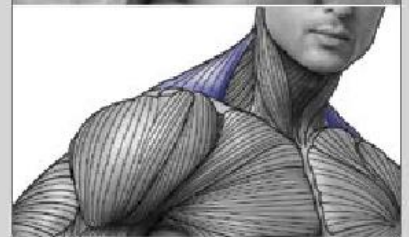
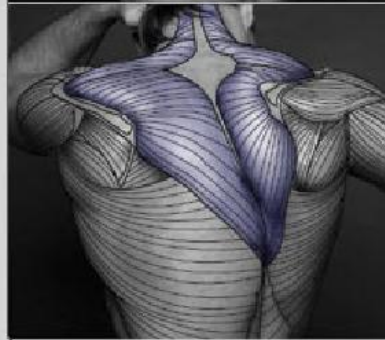
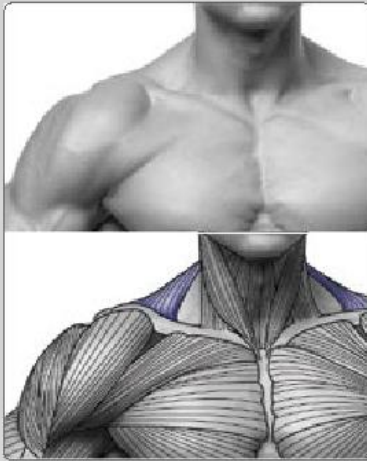
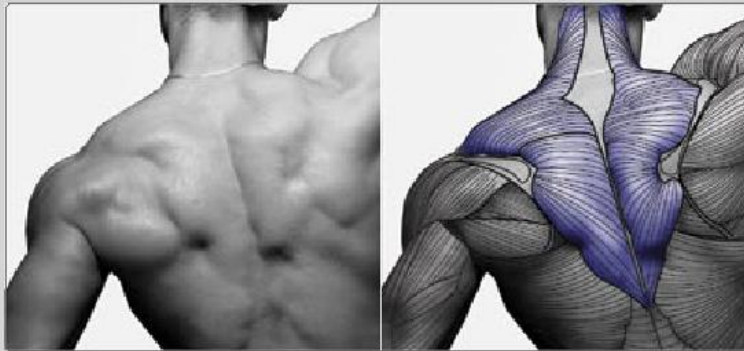
UPPER FIBERS: ELEVATE AND UPWARDLY ROTATE SCAPULA; EXTEND NECK

MIDDLE FIBERS: ADDUCT (RETRACT) SCAPULA

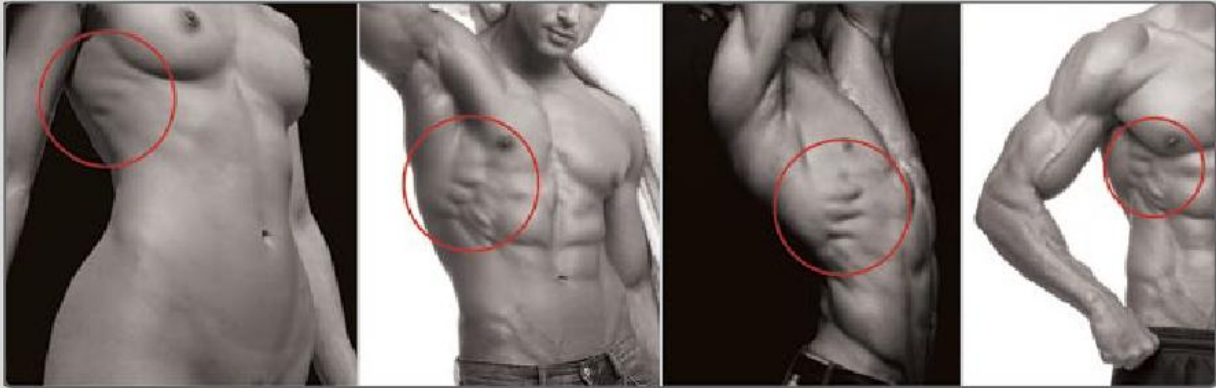
LOWER FIBERS: DEPRESS AND HELP UPPER FIBERS UPWARDLY ROTATE SCAPULA



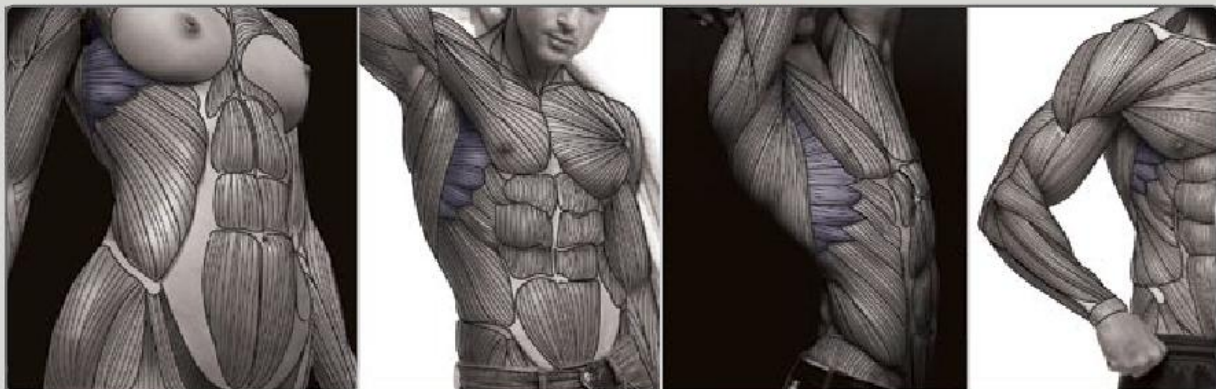
TRAPEZIUS MUSCLE



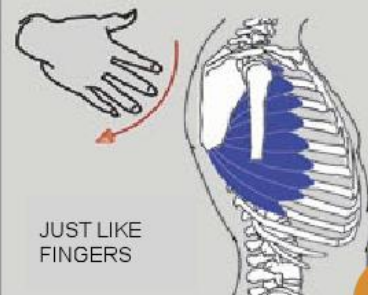
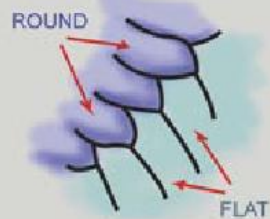
ARE THESE RIBS?



THIS IS A MUSCLE, CALLED **SERRATUS ANTERIOR**

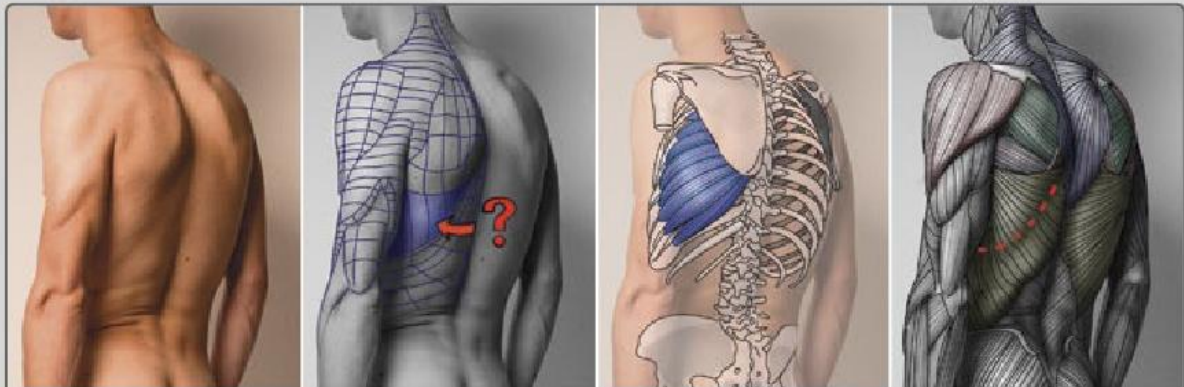


IF PERSON IS SKINNY,
THEN **SERRATUS** IS TOO
FLAT TO BE VISIBLE.



JUST LIKE
FINGERS

WHAT IS THIS BULGE UNDER THE SHOULDER BLADE?

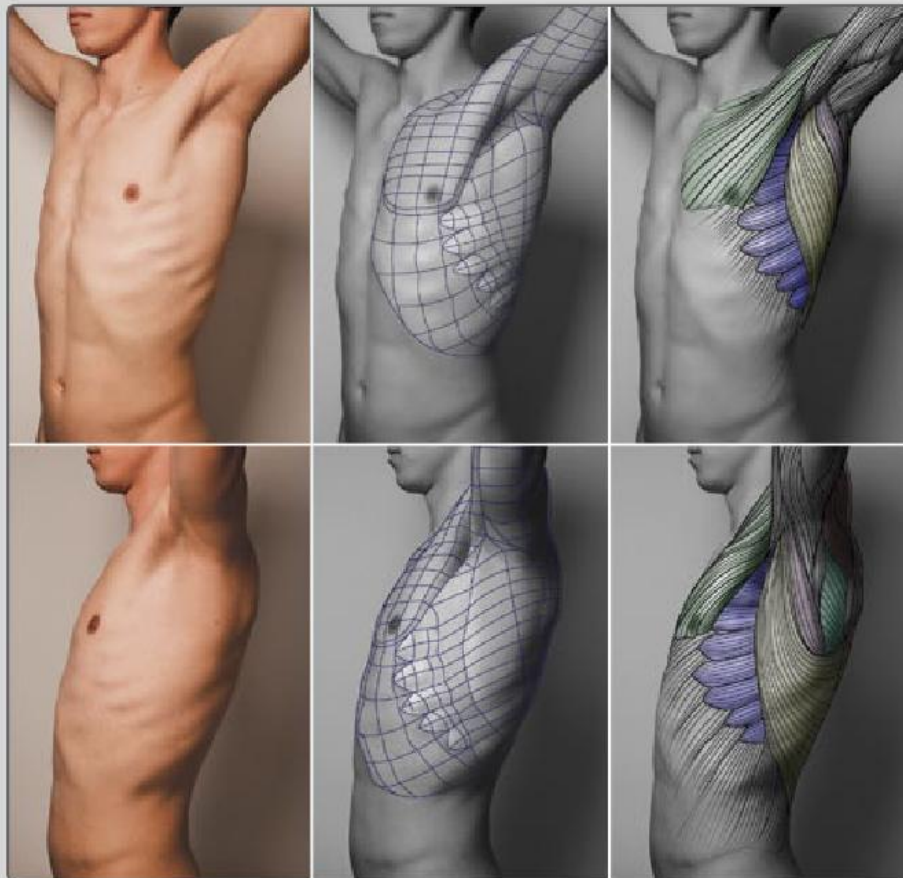


IT IS **THE SERRATUS ANTERIOR** MUSCLE, PUSHING THE **LATISSIMUS DORSI** OUTWARD FROM BENEATH.

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SERRATUS ANTERIOR IS A MUSCLE THAT ORIGINATES ON THE SURFACES OF THE **1ST TO 8TH** RIBS ON THE LATERAL CHEST AND INSERTS ALONG THE ENTIRE ANTERIOR LENGTH OF THE MEDIAL BORDER OF THE SCAPULA.

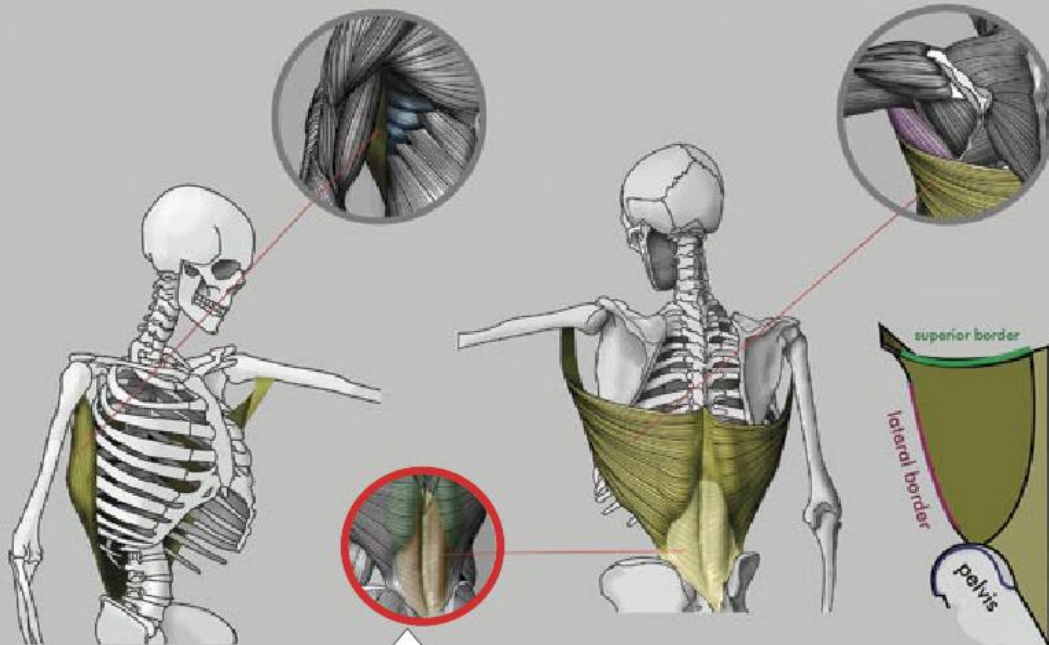
1/4 AND SIDE VIEW



BROADEST MUSCLE OF THE BACK

(LATISSIMUS DORSI – LD)

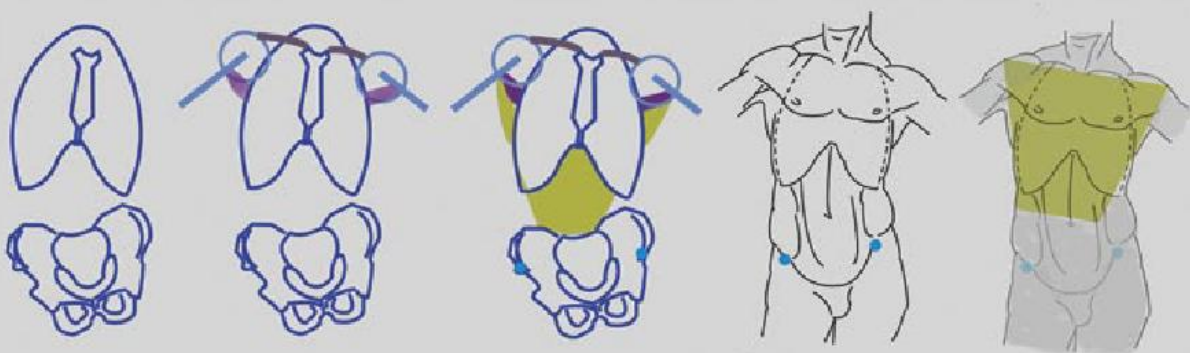
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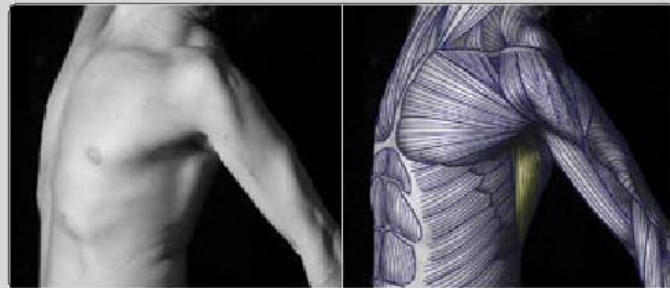
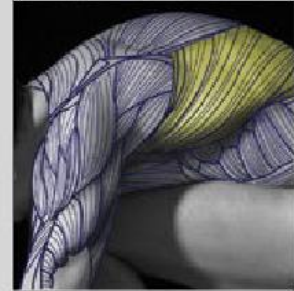
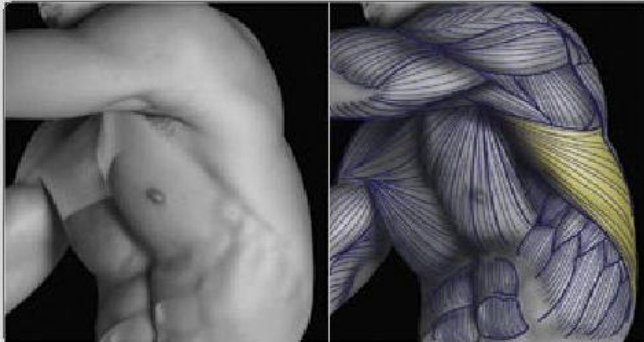
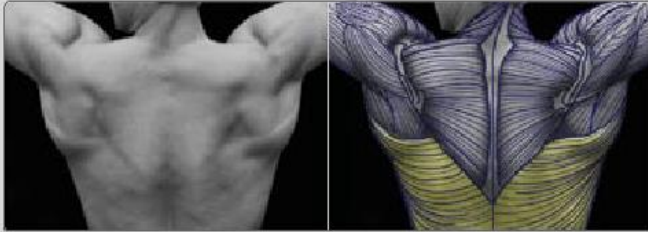
NOTE: THESE TWO SAUSAGES ARE NOT LD. THESE SHAPES ARE CREATED BY THE **ERECTOR SPINAE** PUSHING UP THE LD FROM BELOW.



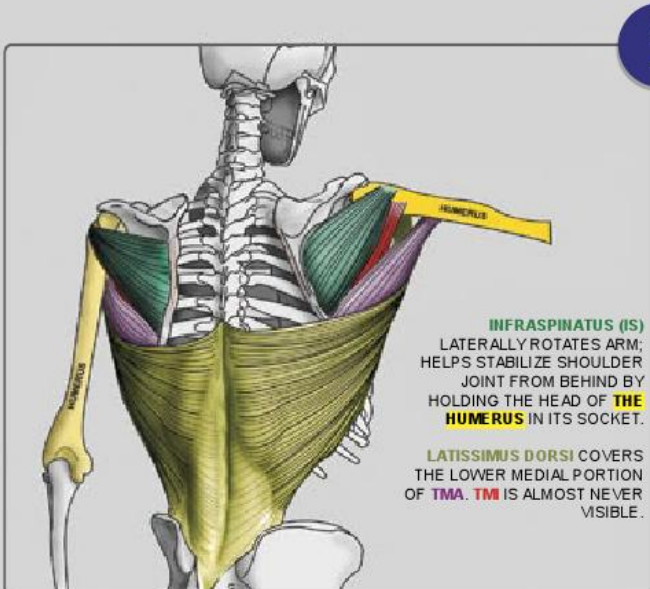
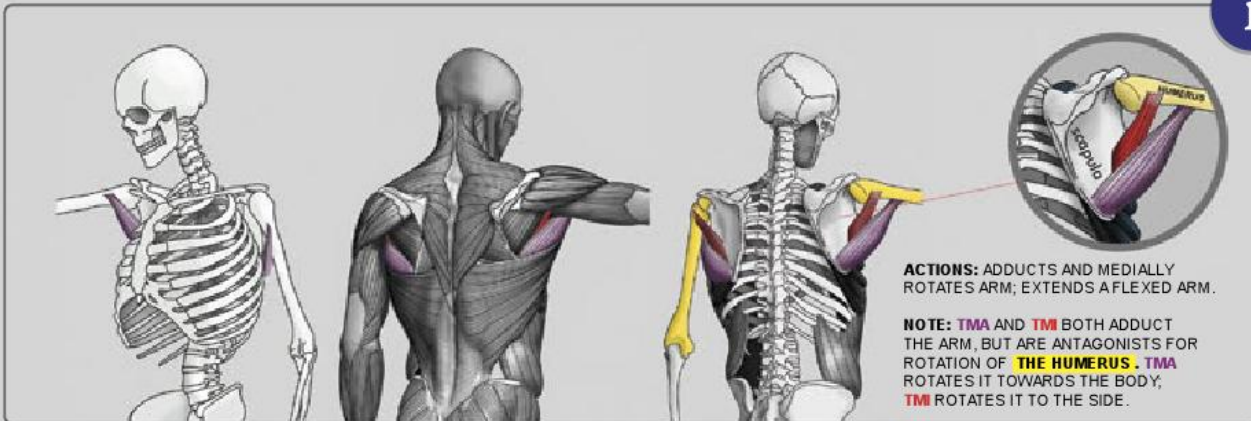
TERES MAJOR COVERED WITH **LATISSIMUS DORSI** CREATES THE TRIANGULAR SHAPE OF A MALE TORSO.



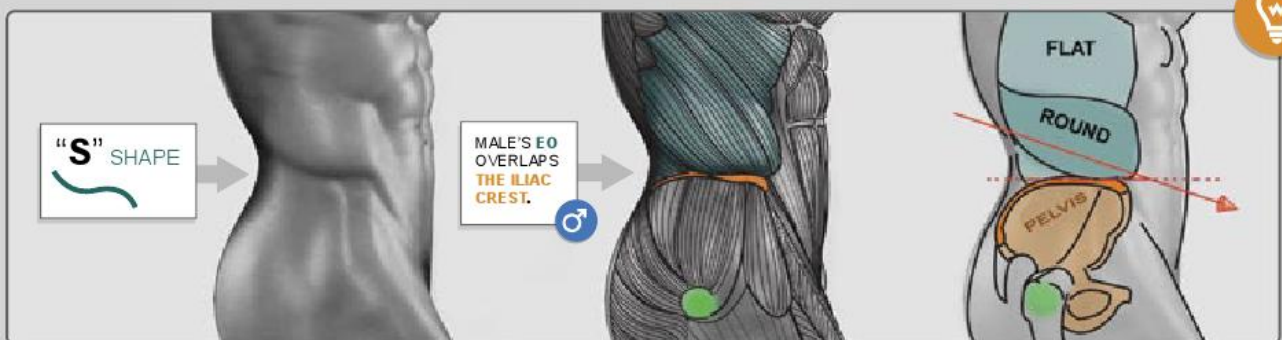
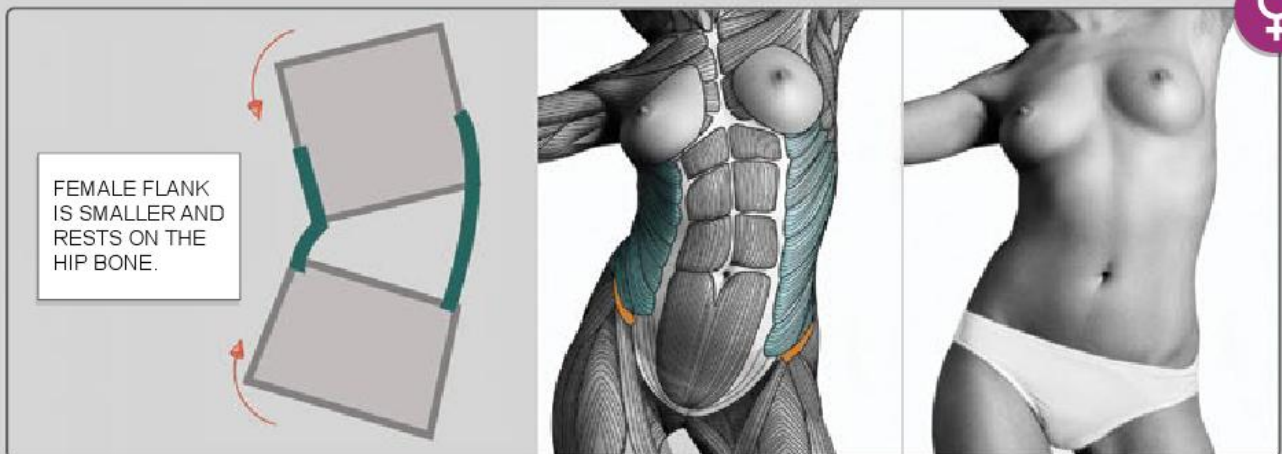
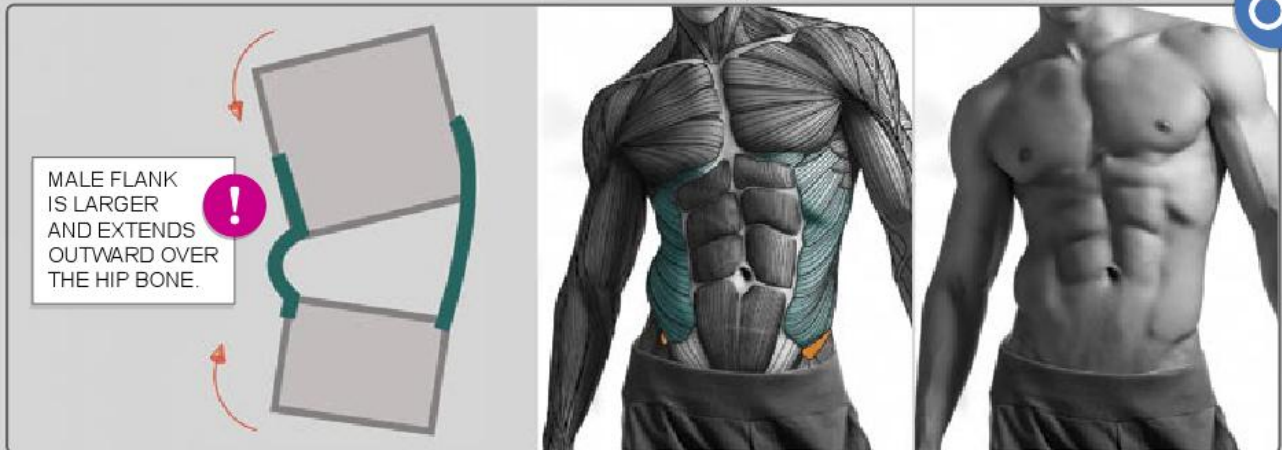
IDENTIFY THE BROADEST MUSCLE OF THE BACK! (LATISSIMUS DORSI)



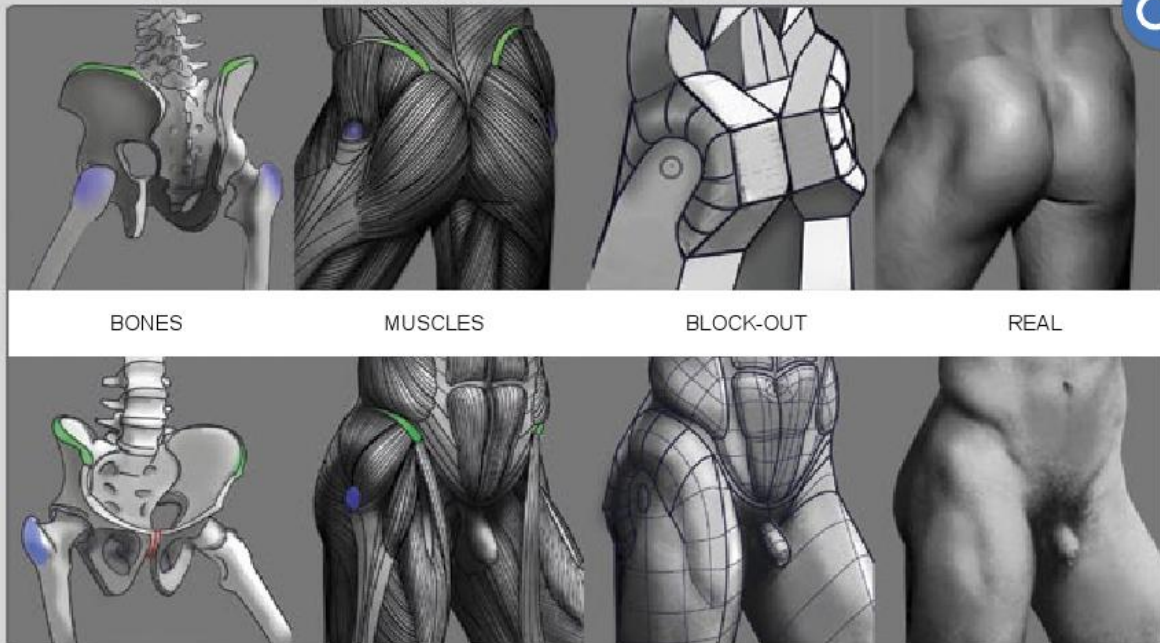
GREAT ROUND MUSCLE (TERES MAJOR TMA), LITTLE ROUND MUSCLE (TERES MINOR TMI) AND INFRASPINATUS MUSCLE (IS)



ABDOMINAL EXTERNAL OBLIQUE MUSCLE (EO)



MALE AND FEMALE HIPS



BONES

MUSCLES

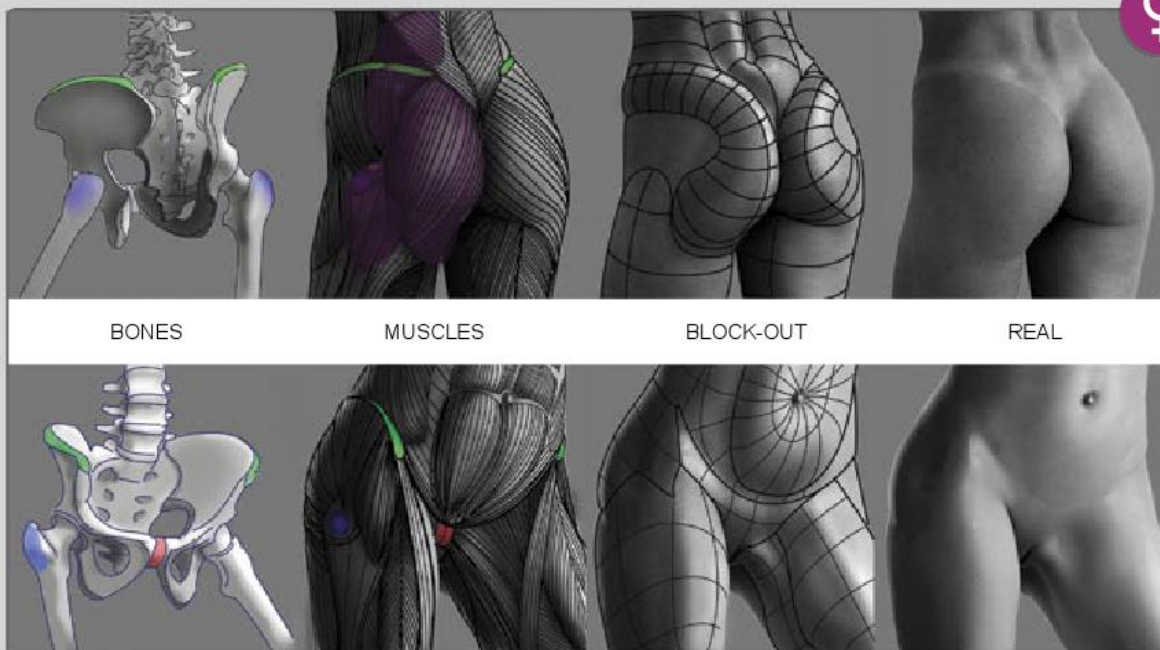
BLOCK-OUT

REAL

● GREATER TROCHANTER

● ILIAC CREST

● PUBIC SYMPHYSIS



BONES

MUSCLES

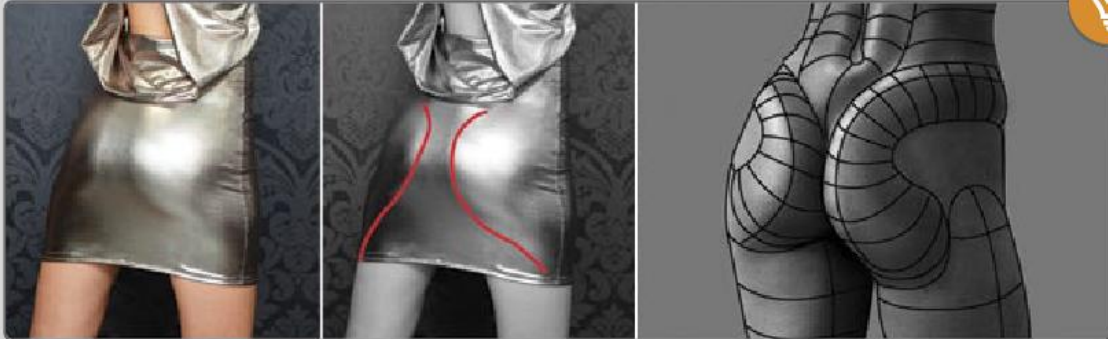
BLOCK-OUT

REAL

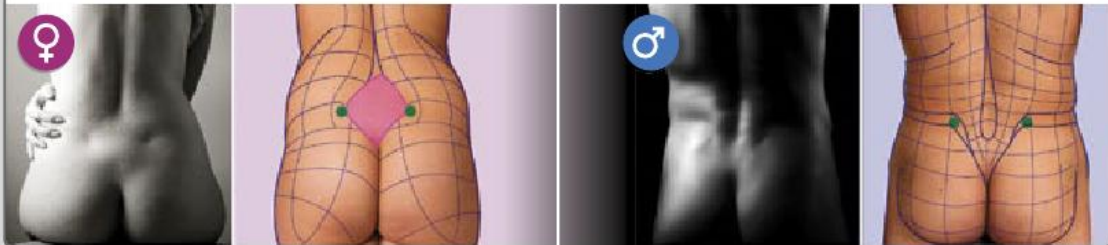


SUBCUTANEOUS **FAT PADS** UNDER THE SKIN GIVE FEMALE HIPS THEIR CURVY SHAPE.

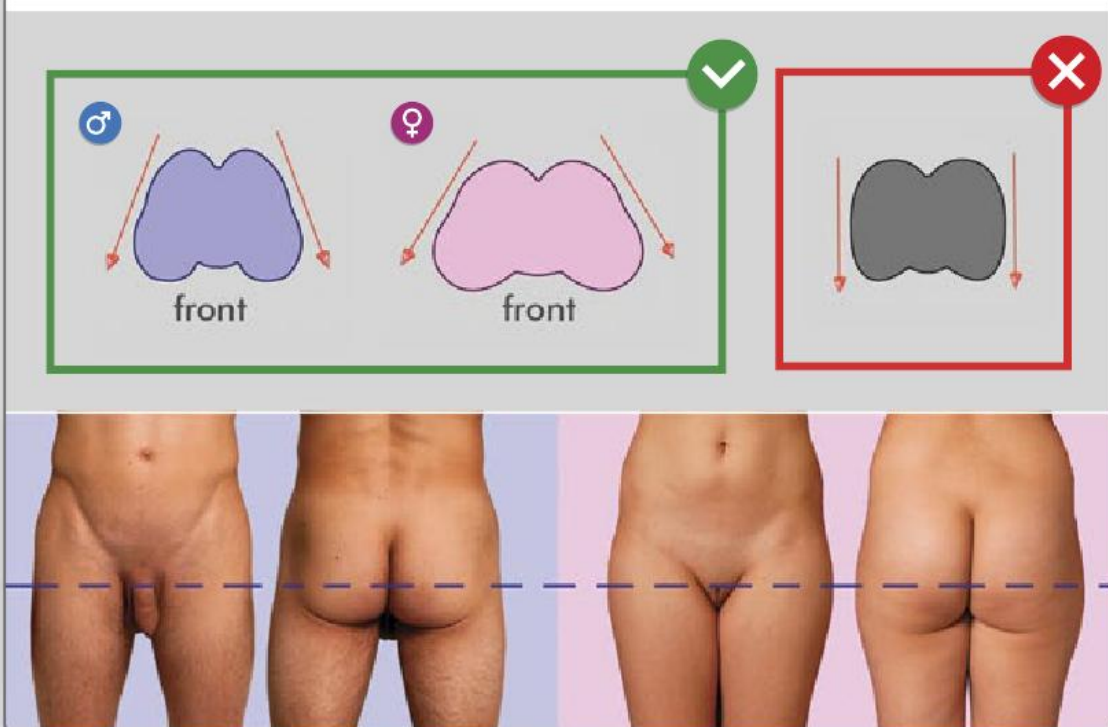
ALL ABOUT “BACKSIDES”



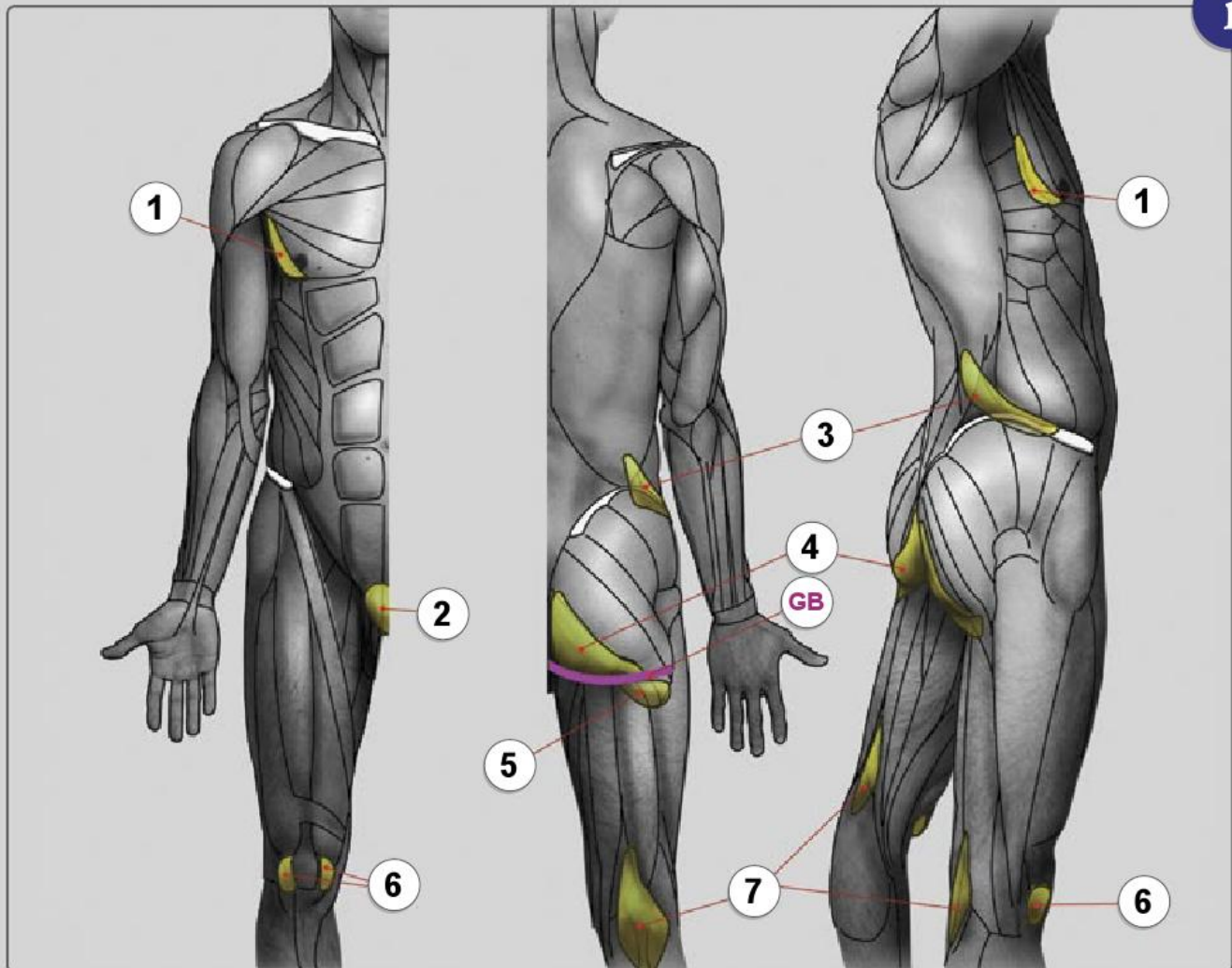
THE “RHOMBUS OF MICHAELIS” IS A FAT PAD THAT IS SOMETIMES VISIBLE ON THE LOWER BACK OF FEMALES.



HORIZONTAL CROSS SECTIONS OF MALE AND FEMALE PELVIS.



MALE SUBCUTANEOUS FAT PADS



1 PECTORAL FAT PAD

2 PUBIC FAT PAD

3 FLANK FAT PAD

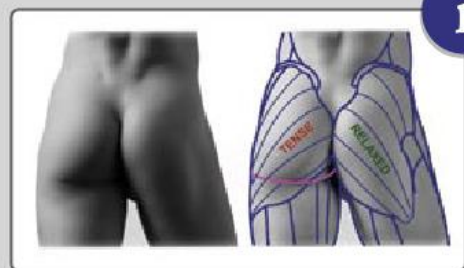
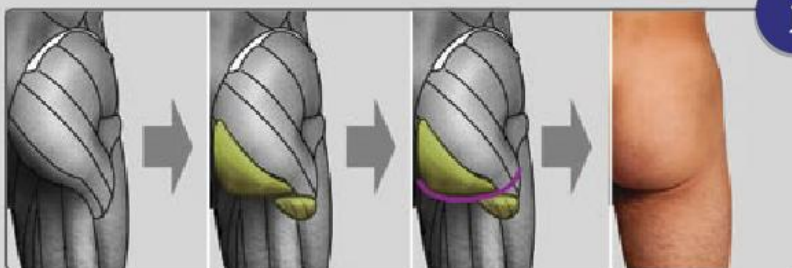
4 LATERAL GLUTEAL FAT PAD

5 INFERIOR GLUTEAL FAT EXTENSION

6 INFRAPATELLAR FAT PAD

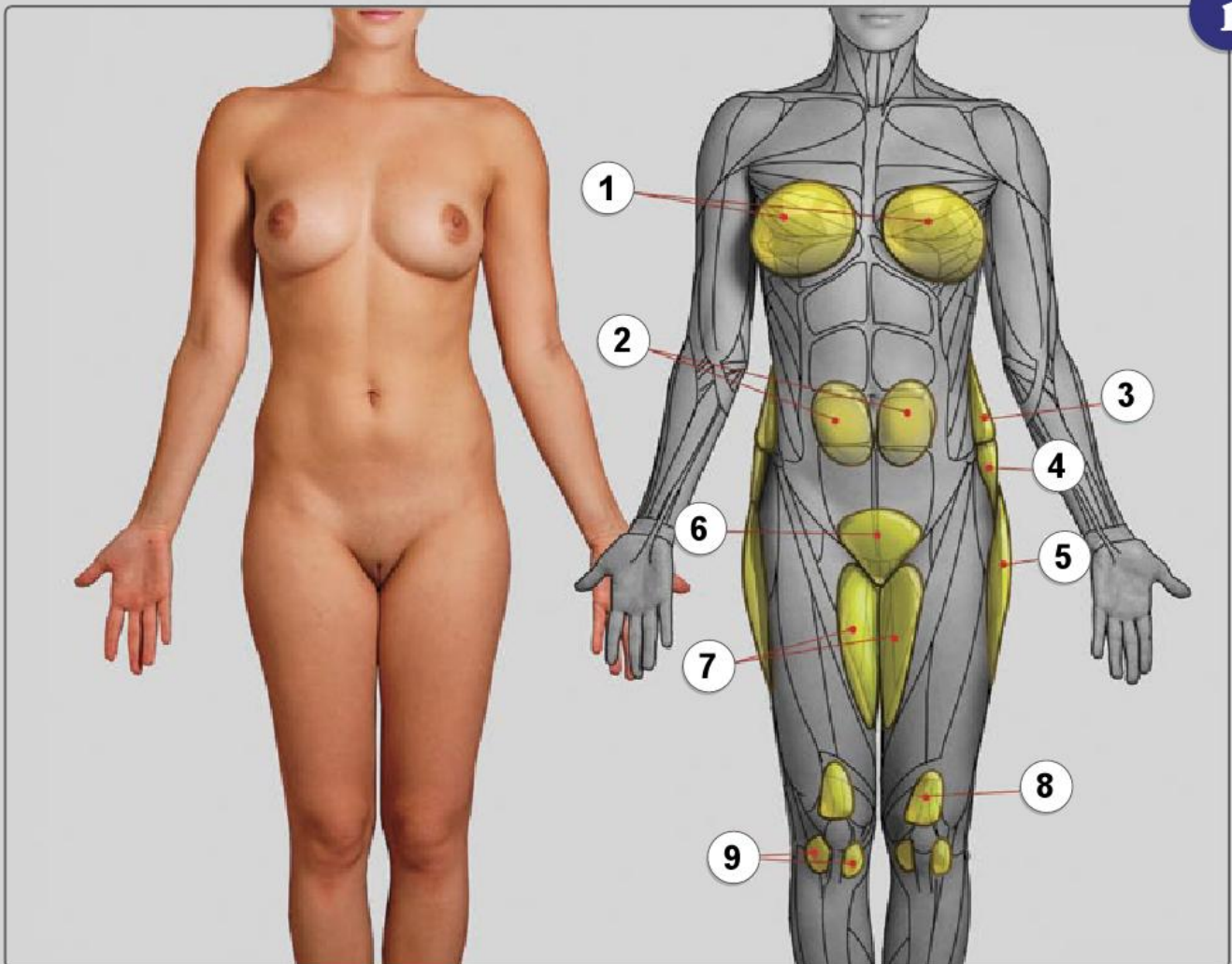
7 POPLITEAL FAT PAD

GB **GLUTEAL BAND** – CREATES SKIN FOLD. WHEN THE THIGH FLEXES, GLUTEAL FOLD DISAPPEARS.

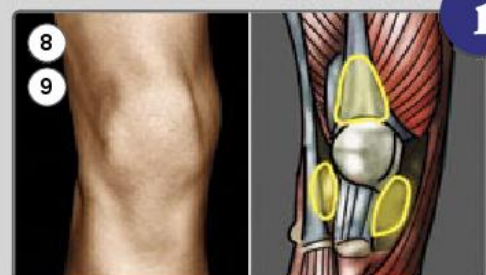
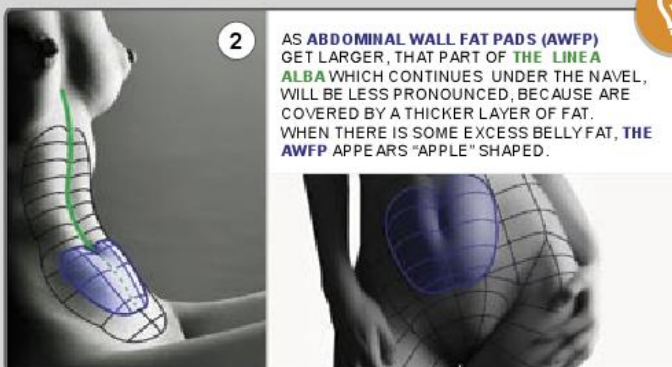


FEMALE SUBCUTANEOUS FAT PADS

(FRONT VIEW)

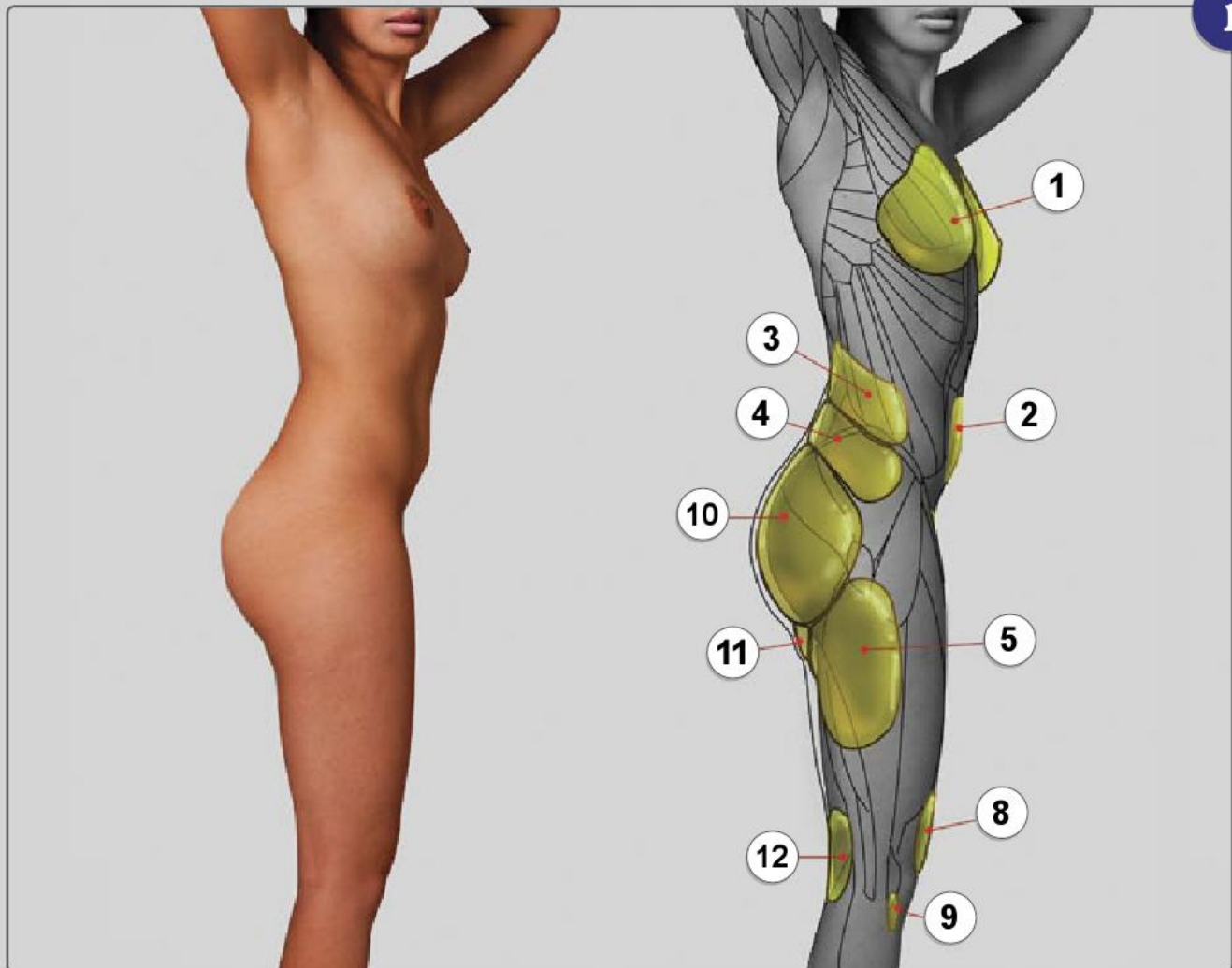


- | | | |
|--------------------------|---------------------------|--------------------------------|
| 1 BREAST FAT | 4 LATERAL GLUTEAL FAT PAD | 6 PUBIC FAT PAD |
| 2 ABDOMINAL WALL FAT PAD | 5 OUTER THIGH FAT PAD | 7 INNER THIGH FAT PAD |
| 3 FLANK FAT PAD | | 8 LOWER ANTERIOR THIGH FAT PAD |
| | | 9 INFRAPATELLAR FAT PAD |

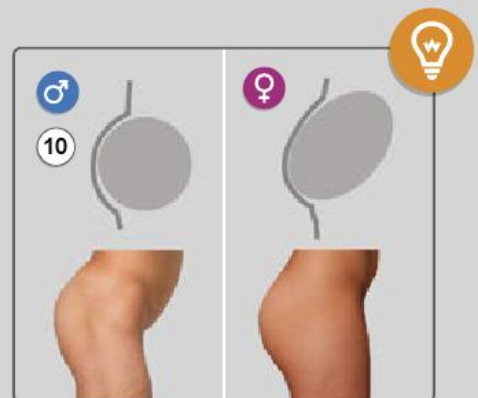


FEMALE SUBCUTANEOUS FAT PADS

(SIDE VIEW)



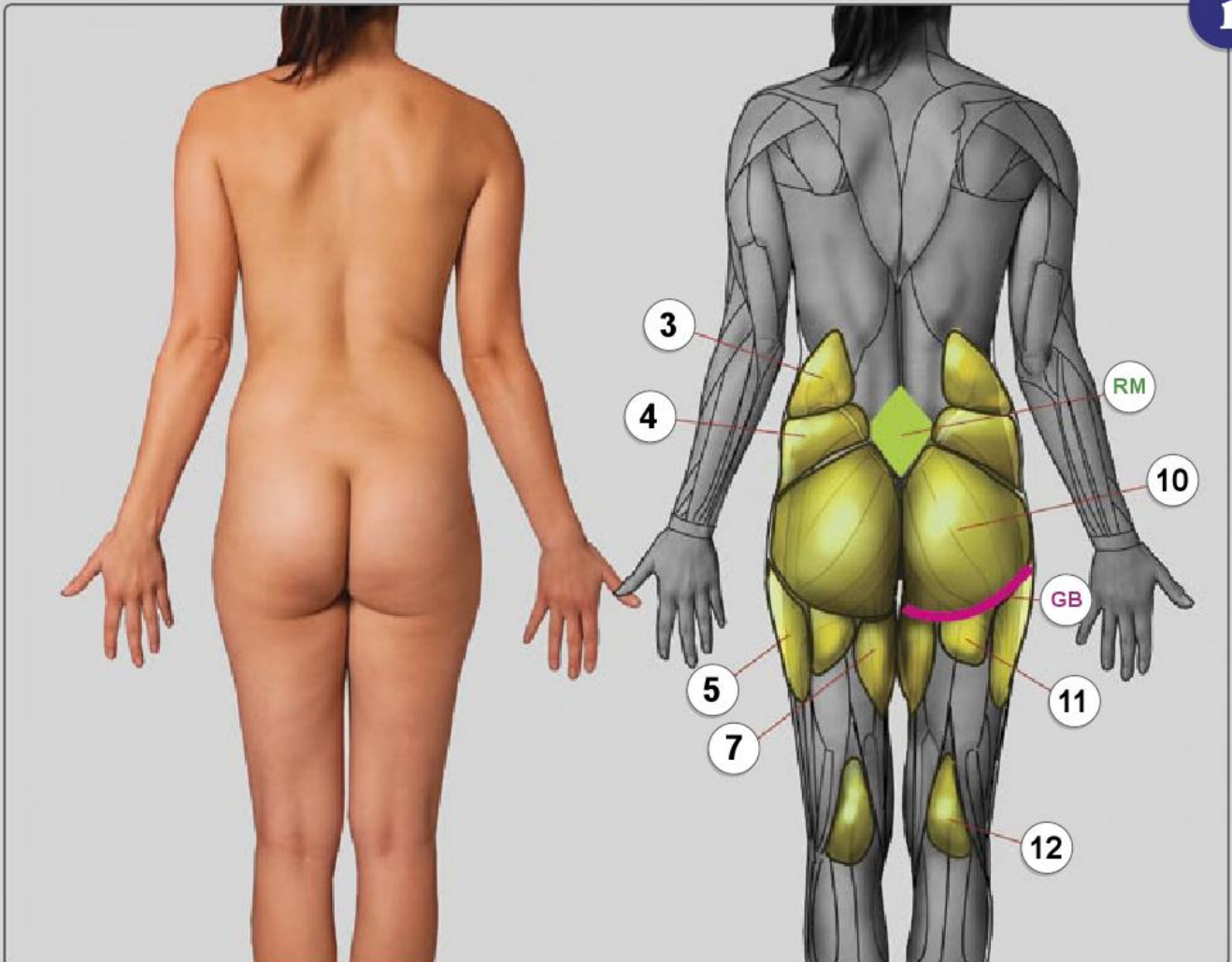
- | | | |
|---------------------------|--------------------------------|-----------------------------------|
| 1 BREAST FAT | 5 OUTER THIGH FAT PAD | 11 INFERIOR GLUTEAL FAT EXTENSION |
| 2 ABDOMINAL FAT PAD | 8 LOWER ANTERIOR THIGH FAT PAD | 12 POPLITEAL FAT PAD |
| 3 FLANK FAT PAD | 9 INFRAPATELLAR FAT PAD | |
| 4 LATERAL GLUTEAL FAT PAD | 10 POSTERIOR GLUTEAL FAT PAD | |



FEMALE SUBCUTANEOUS FAT PADS

(BACK VIEW)

i



- | | | |
|---------------------------|---------------------------|--|
| 3 FLANK FAT PAD | 5 OUTER THIGH FAT PAD | 10 POSTERIOR GLUTEAL FAT PAD |
| 4 LATERAL GLUTEAL FAT PAD | 7 INNER THIGH FAT PAD | 11 INFERIOR GLUTEAL FAT EXTENSION |
| 12 POPLITEAL FAT PAD | RM "RHOMBUS OF MICHAELIS" | GB GLUTEAL BAND – CREATES SKIN FOLD. WHEN THE THIGH IS FLEXED, GLUTEAL FOLD DISAPPEARS |

FEMALES HAVE MORE AND MUCH THICKER SUBCUTANEOUS FAT PADS THAN MALES. THIS IS WHY "TYPICAL FEMALE CURVES" APPEAR.



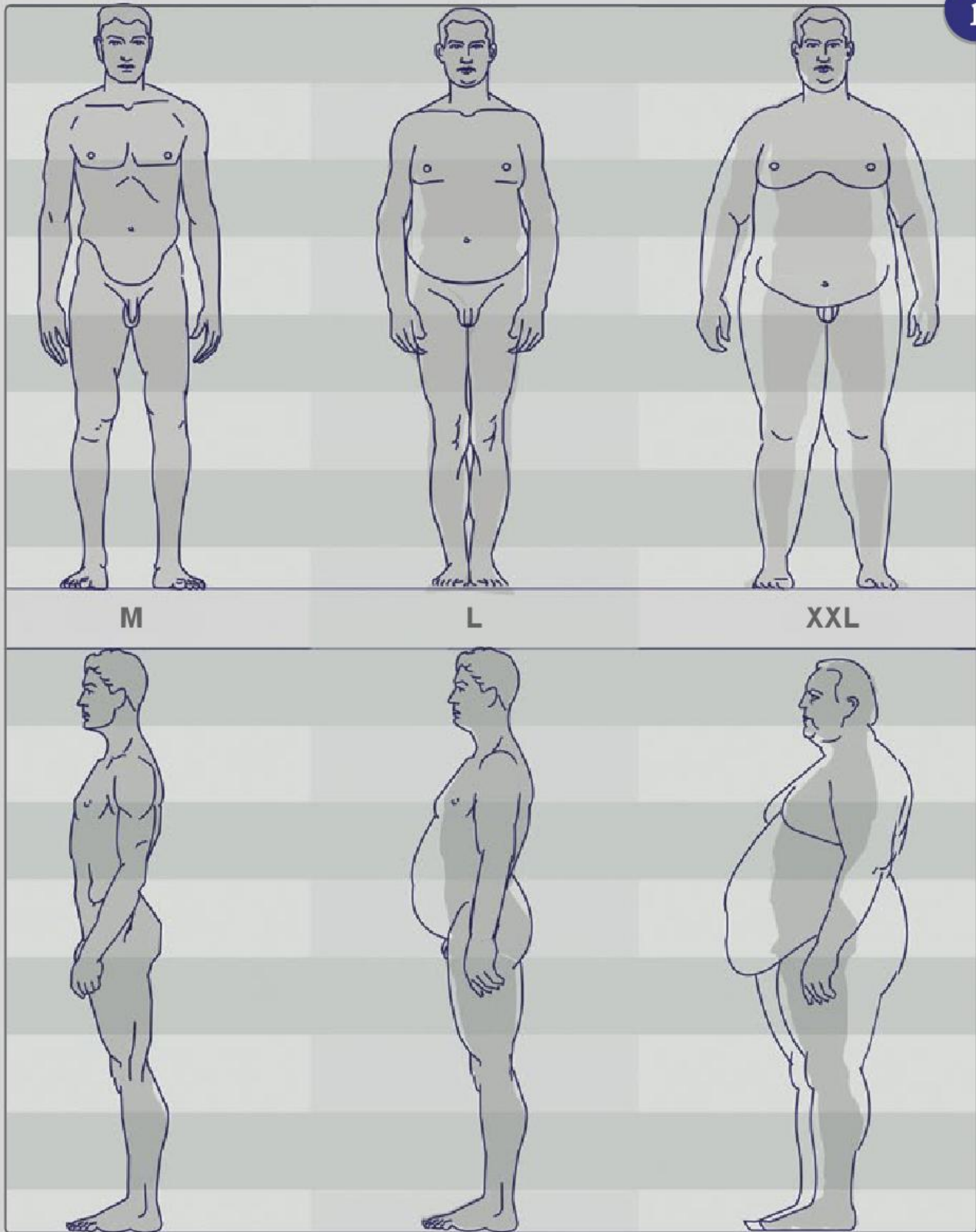
WHEN THE LEG IS STRAIGHT, POPLITEAL FAT PAD POPS OUT!



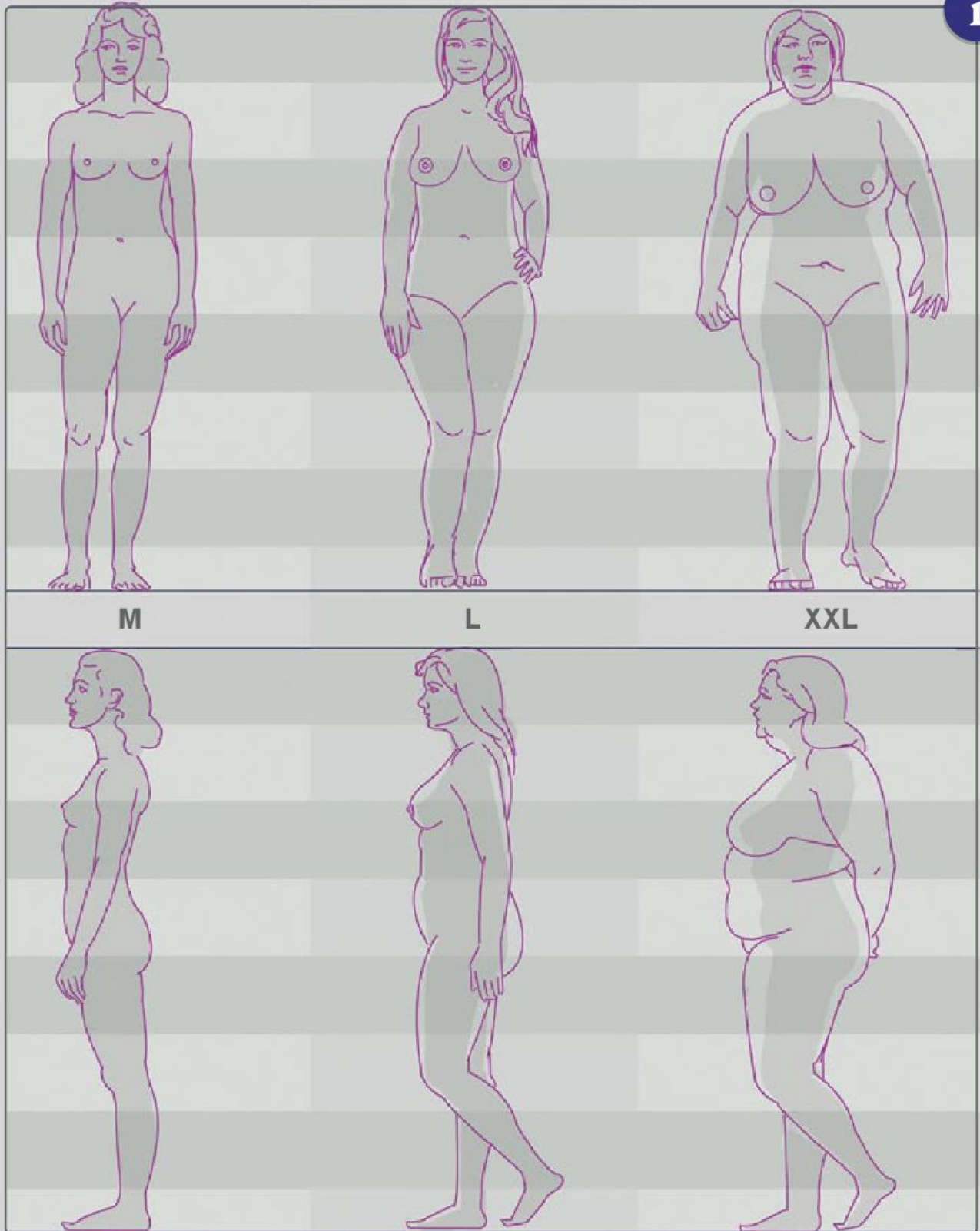
EXTREMELY FATLESS (DRY) BODY CASE.

PROPORTIONAL CHANGES OF AN OBESE MALE: 7.5 HEAD UNITS

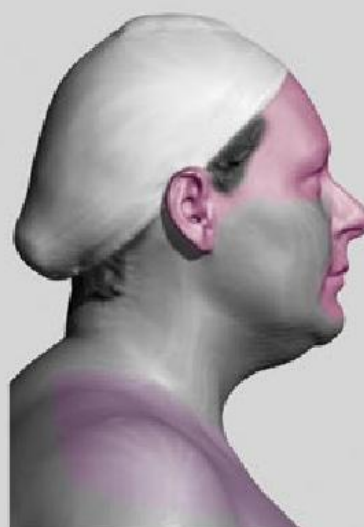
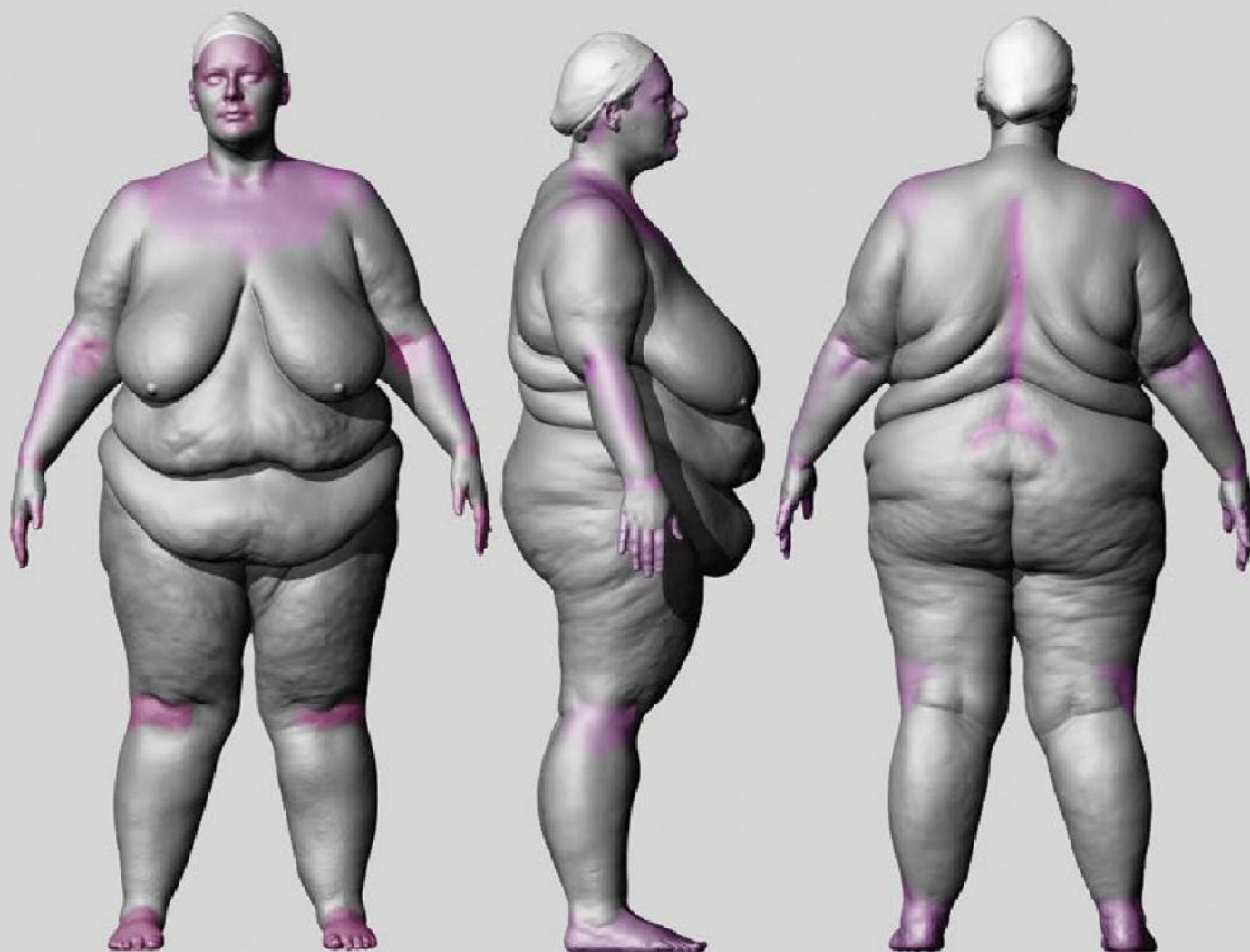
i



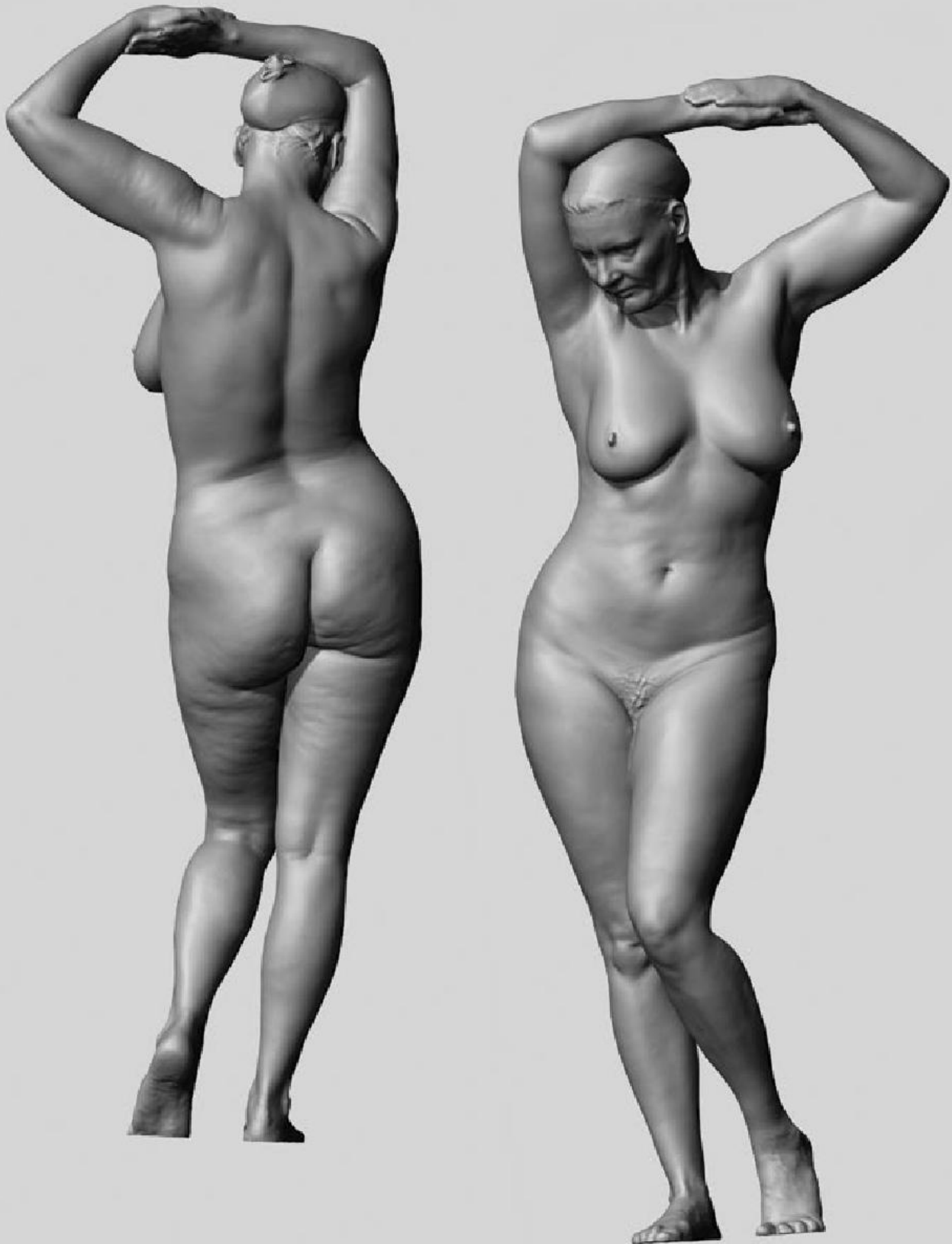
PROPORTIONAL CHANGES OF AN OBESE FEMALE: 7.5 HEAD UNITS



AREAS OF THE BODY THAT ARE LESS AFFECTED BY FAT ACCUMULATION



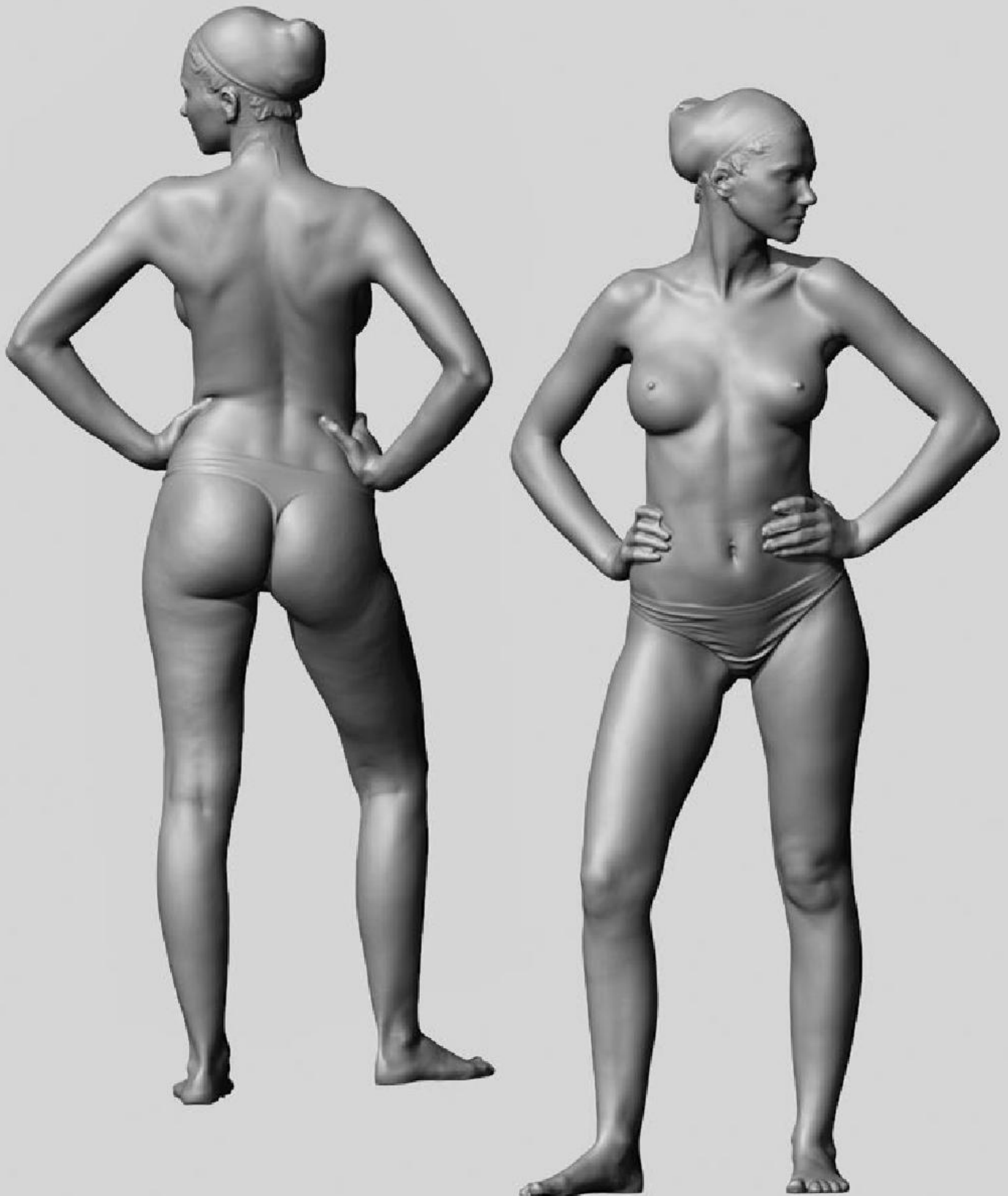
3D SCAN OF MIDDLE-AGED WOMAN



3D SCAN OF YOUNG FEMALE



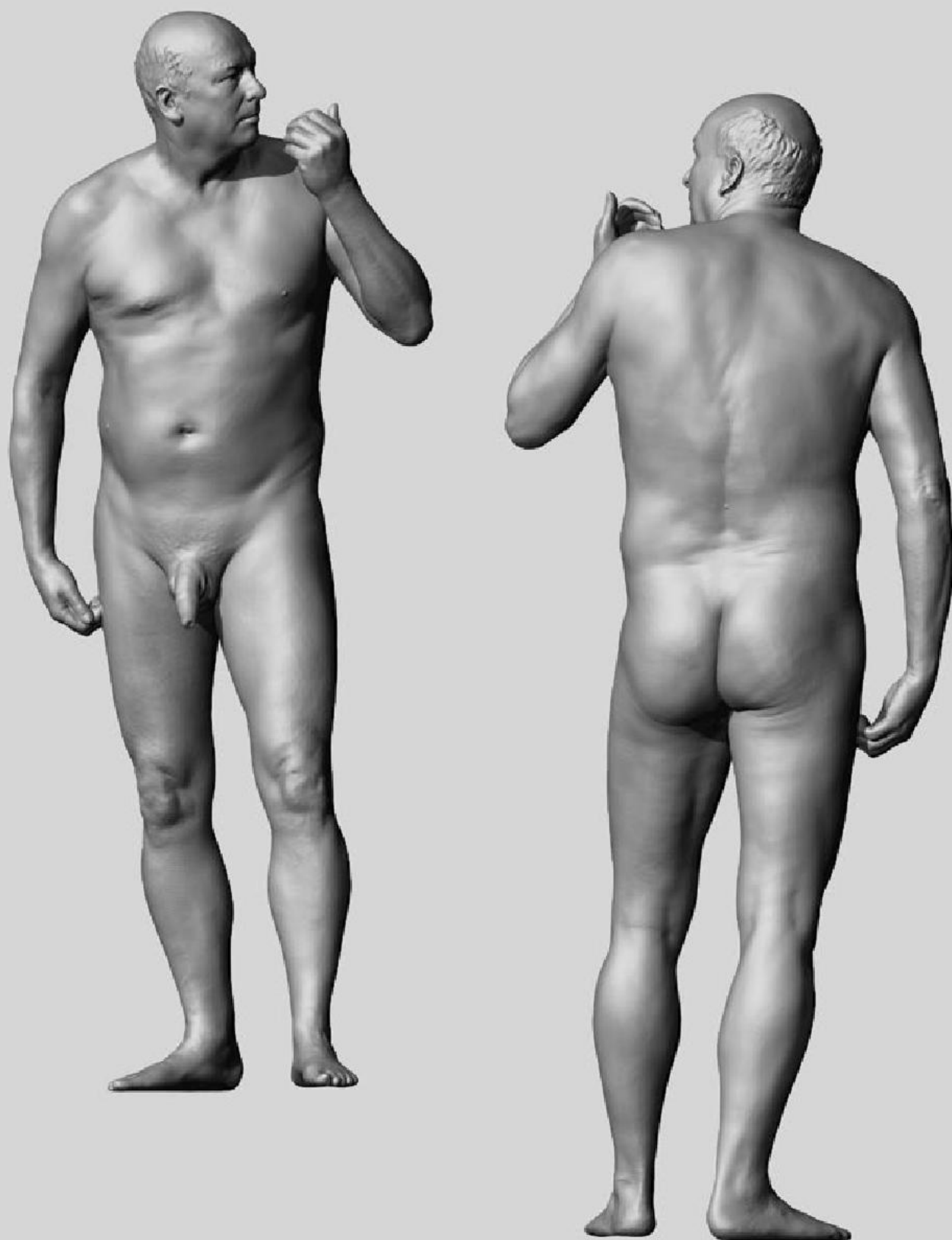
3D SCAN OF YOUNG FEMALE



3D SCAN OF YOUNG MAN



3D SCAN OF MIDDLE-AGED MAN



ARMS REACHING BEHIND BODY



3/4



RIGHT SIDE



3/4



FRONT



BACK



LEFT SIDE

ARMS AT SIDES



3/4



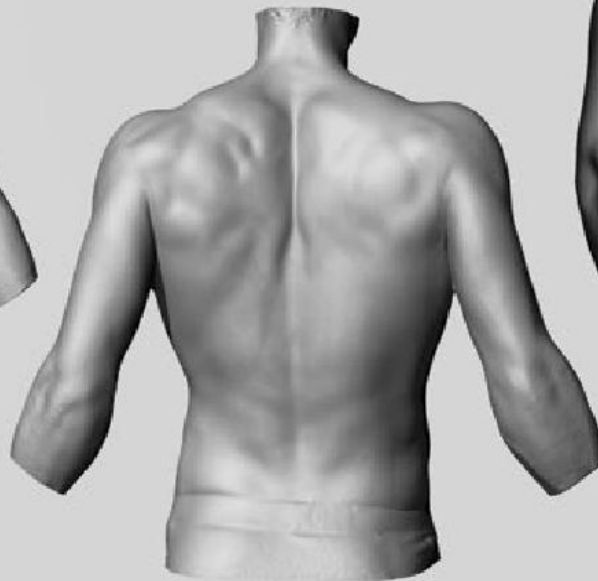
LEFT SIDE



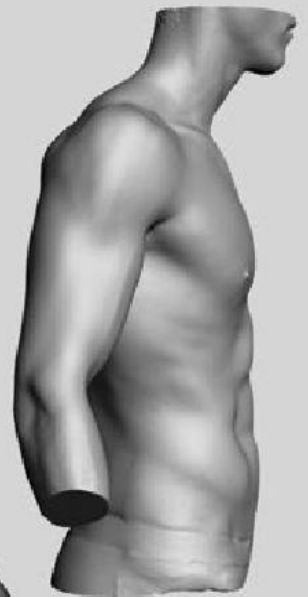
3/4



FRONT



BACK



RIGHT SIDE

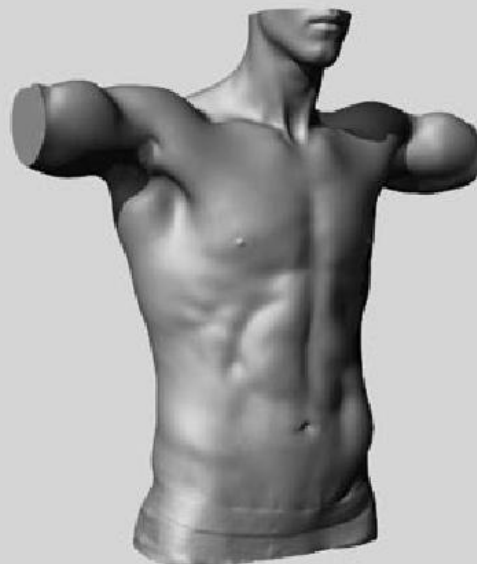
ARMS HELD STRAIGHT OUT TO SIDES



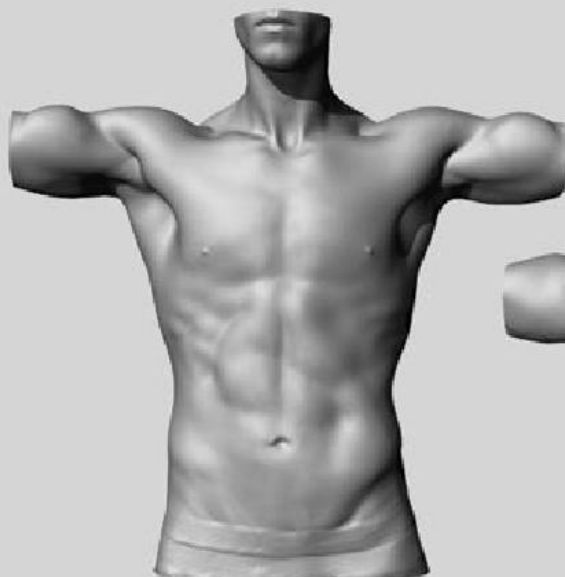
3/4



LEFT SIDE



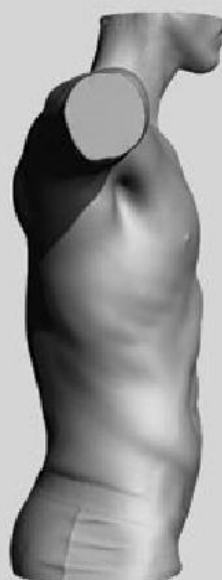
3/4



FRONT



BACK



RIGHT SIDE

ARMS IN A “Y” POSITION



3/4



LEFT SIDE



3/4



FRONT

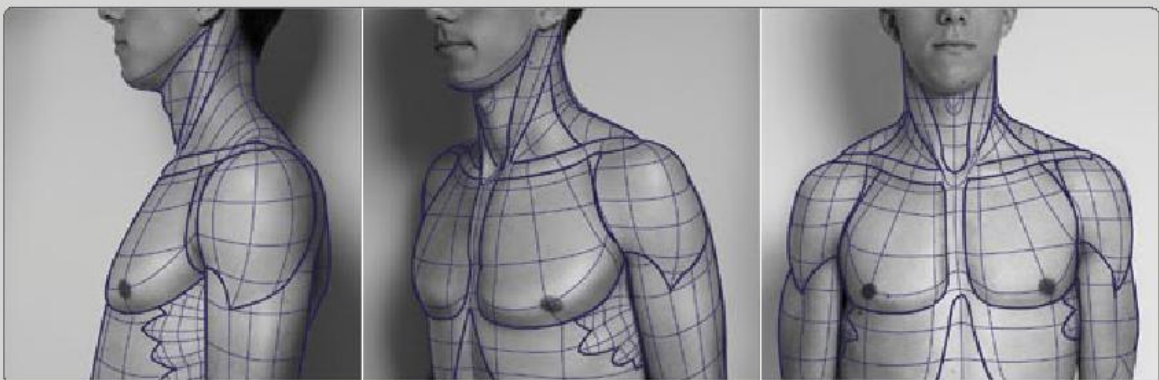
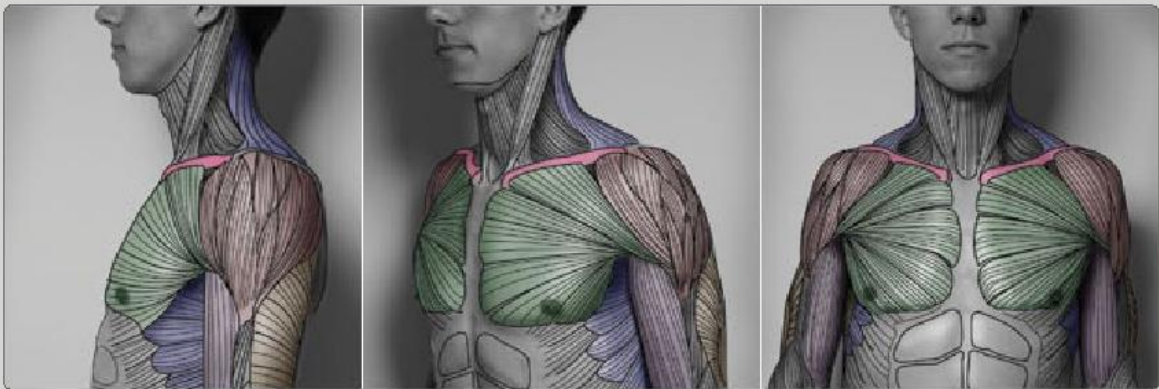


BACK

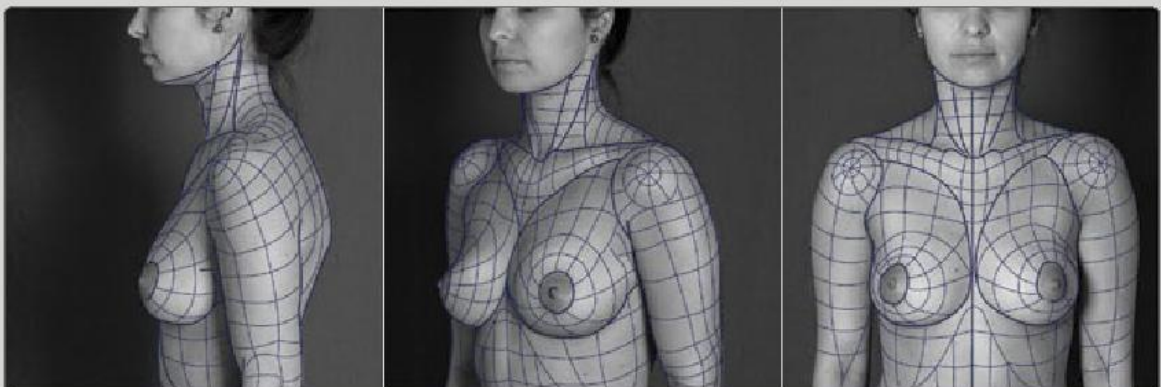
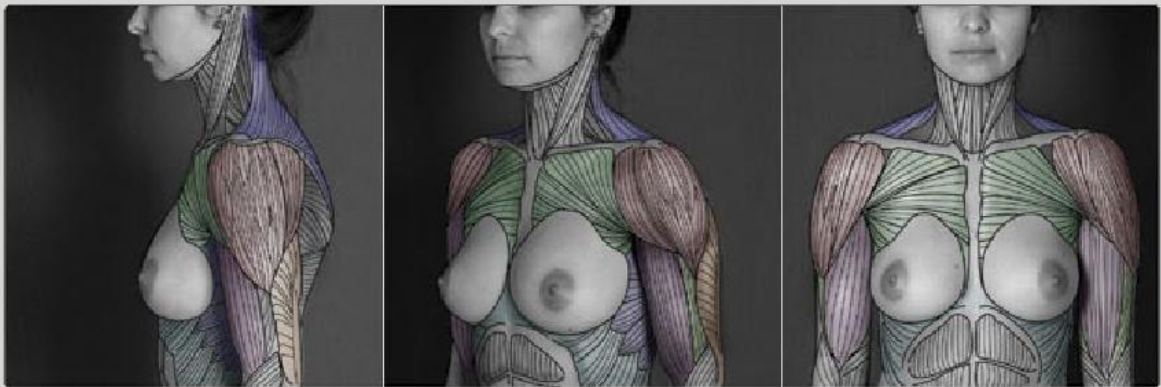


RIGHT SIDE

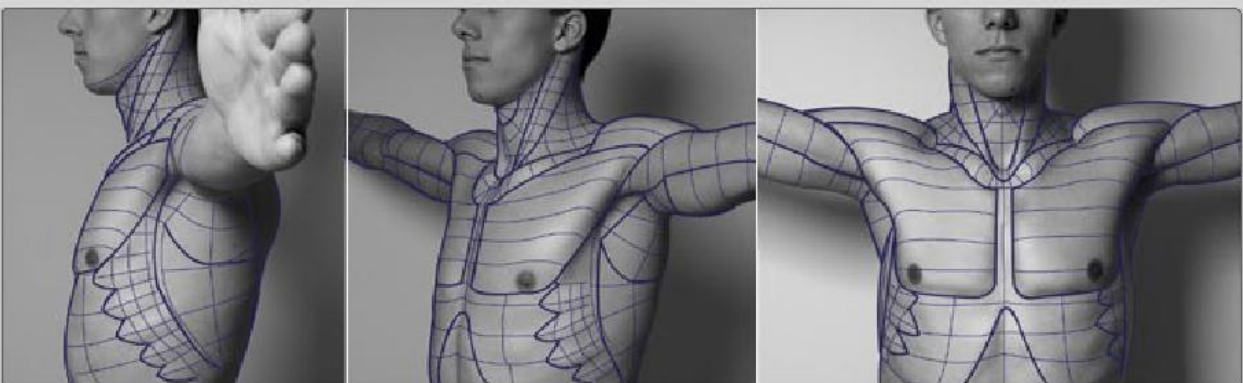
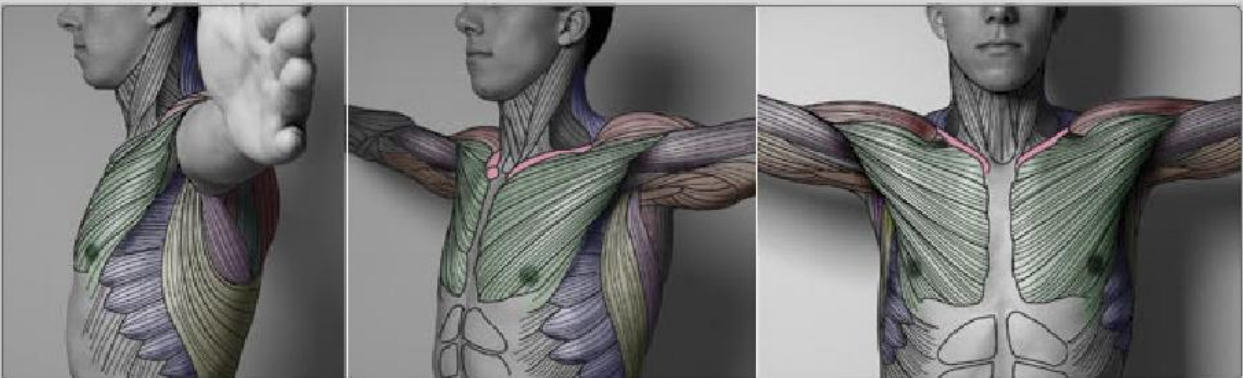
ARMS HANGING NATURALLY – MALE



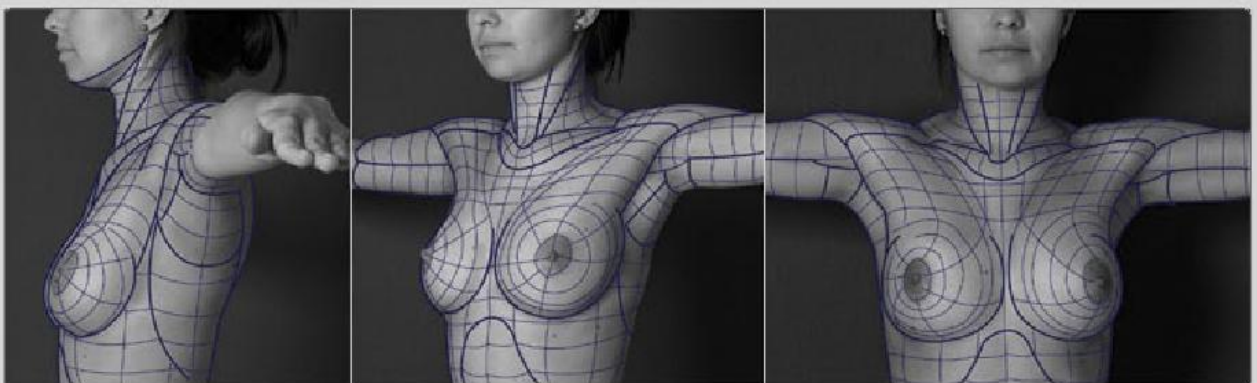
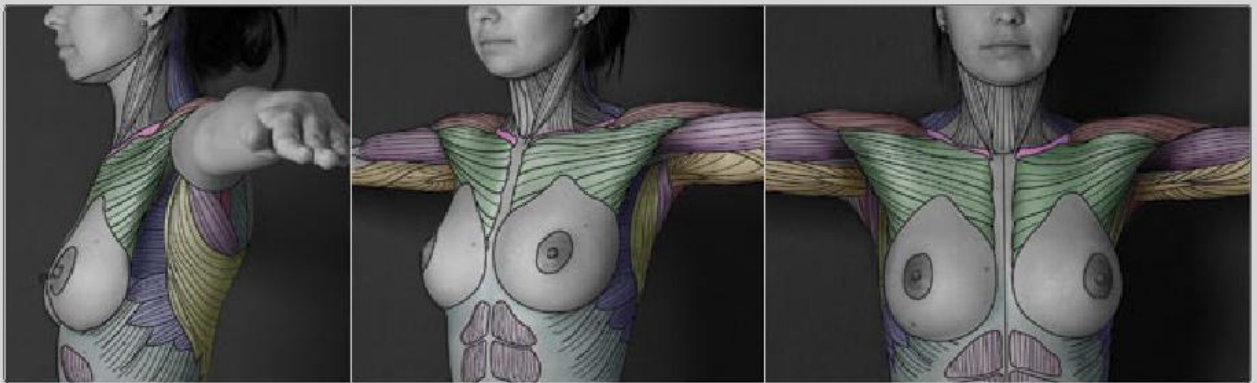
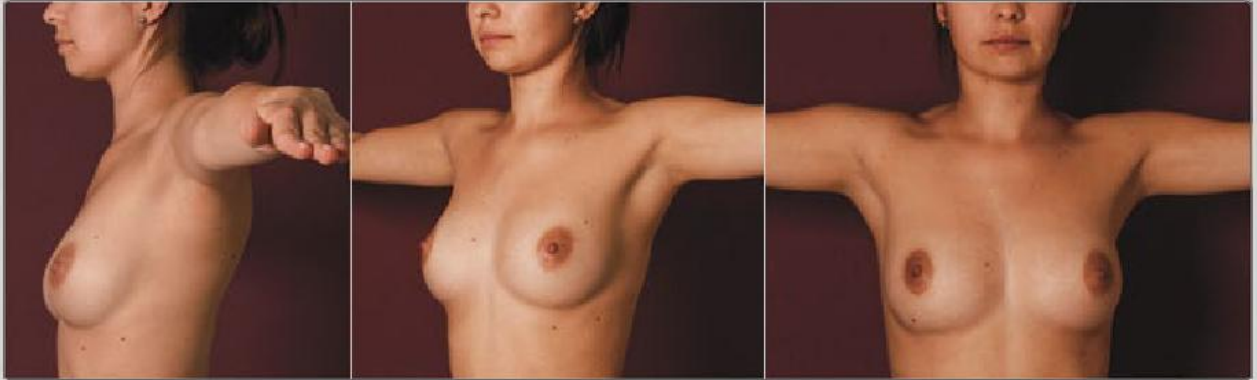
ARMS HANGING NATURALLY – FEMALE



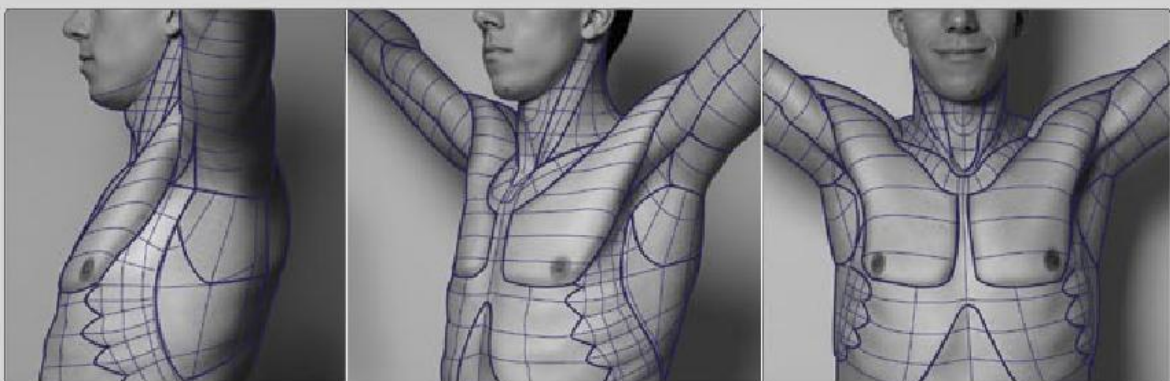
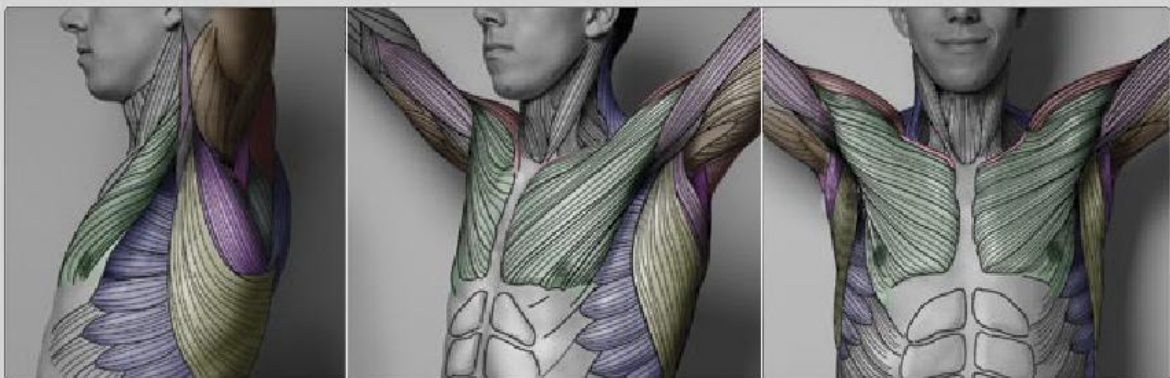
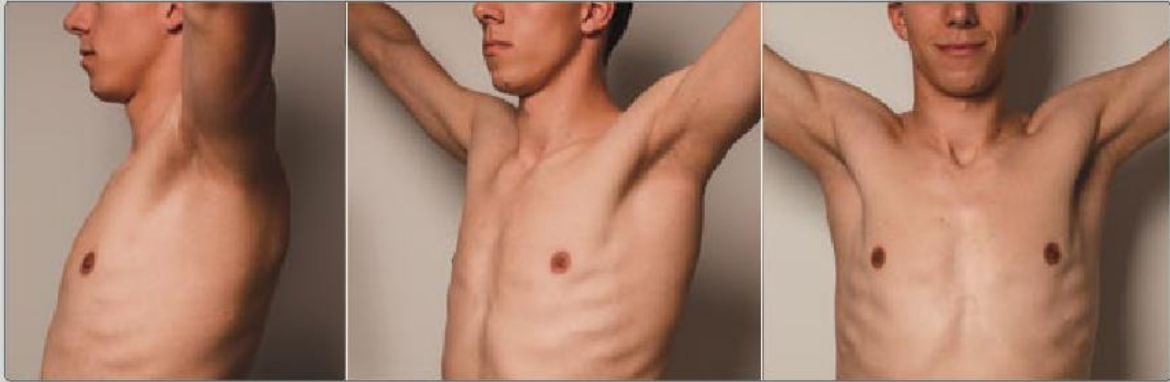
ARMS HELD STRAIGHT OUT TO SIDES – MALE



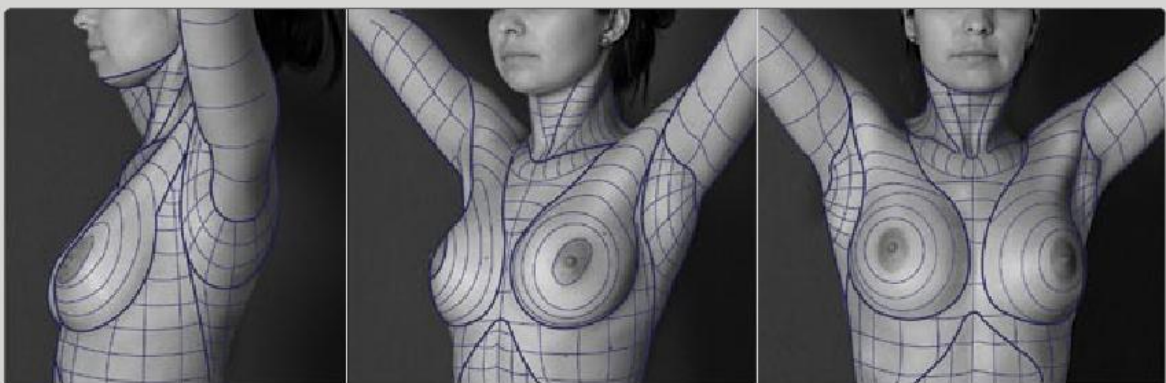
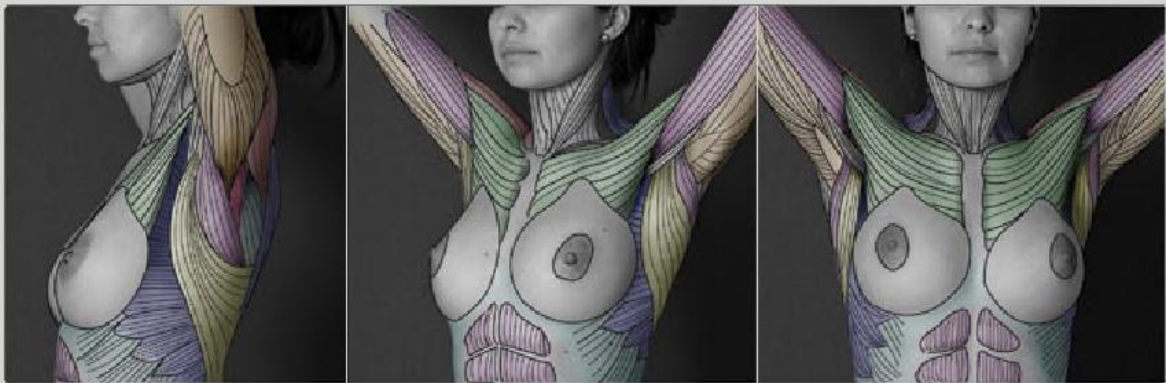
ARMS HELD STRAIGHT OUT TO SIDES – FEMALE



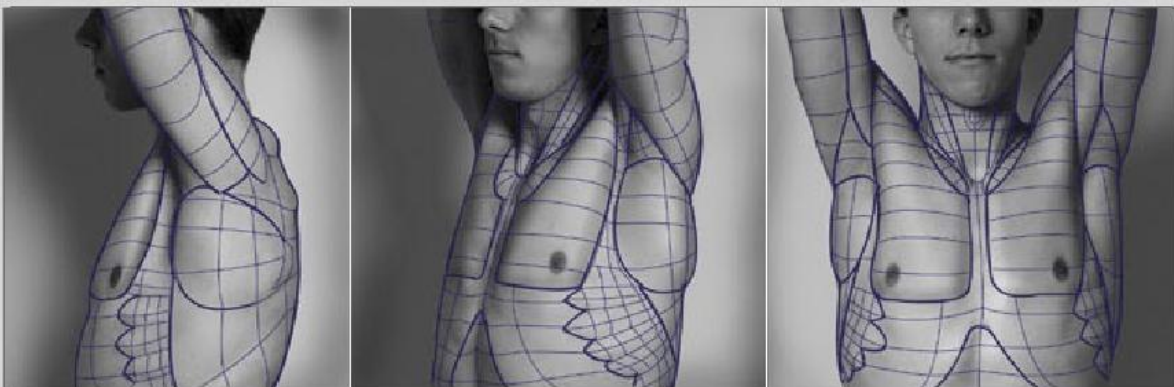
ARMS IN A “Y” POSITION – MALE



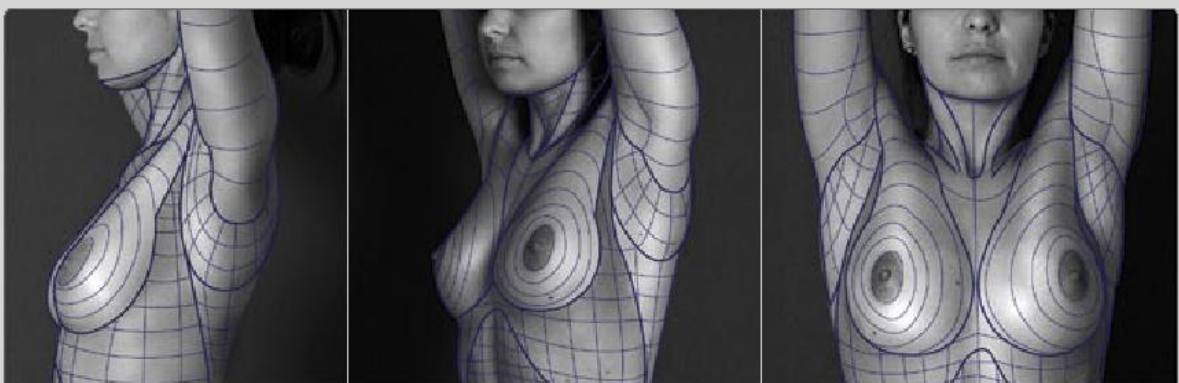
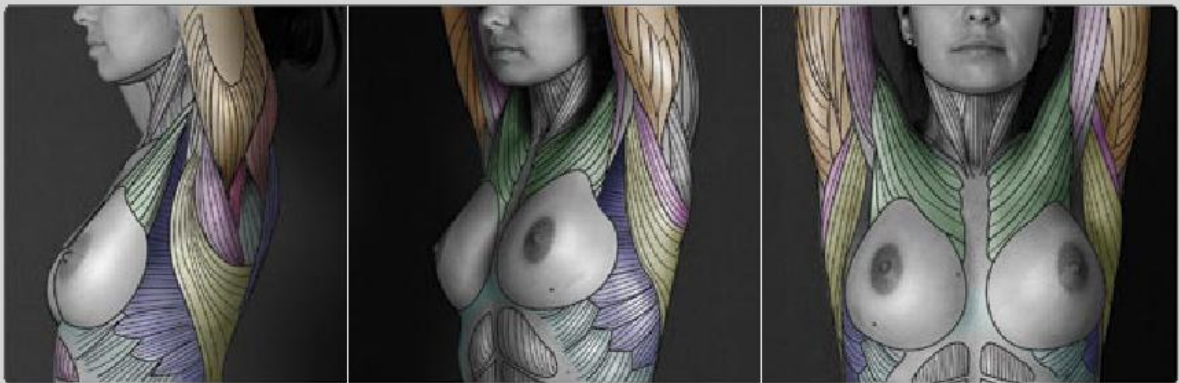
ARMS IN A “Y” POSITION – FEMALE



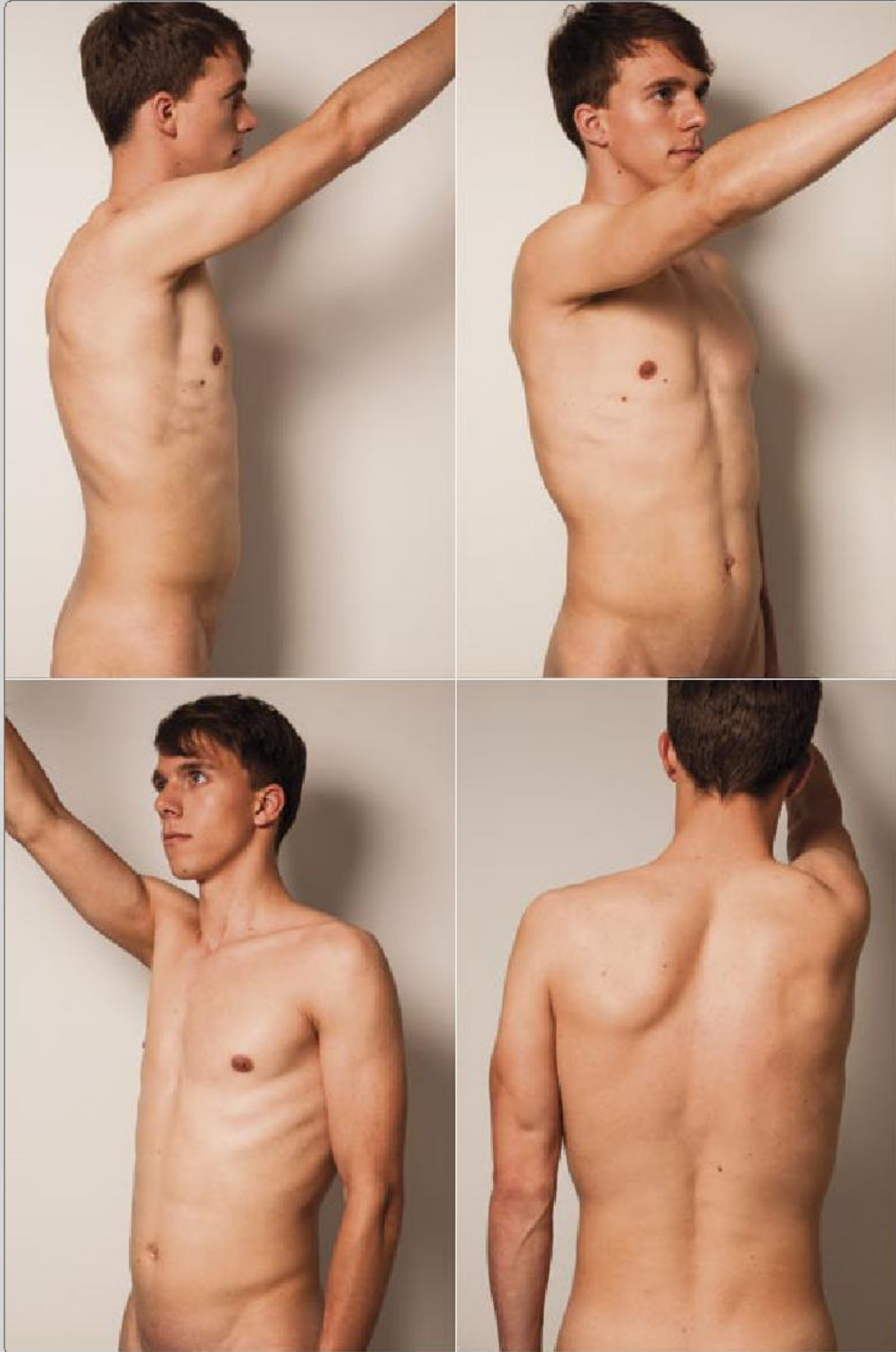
ARMS STRAIGHT UP – MALE



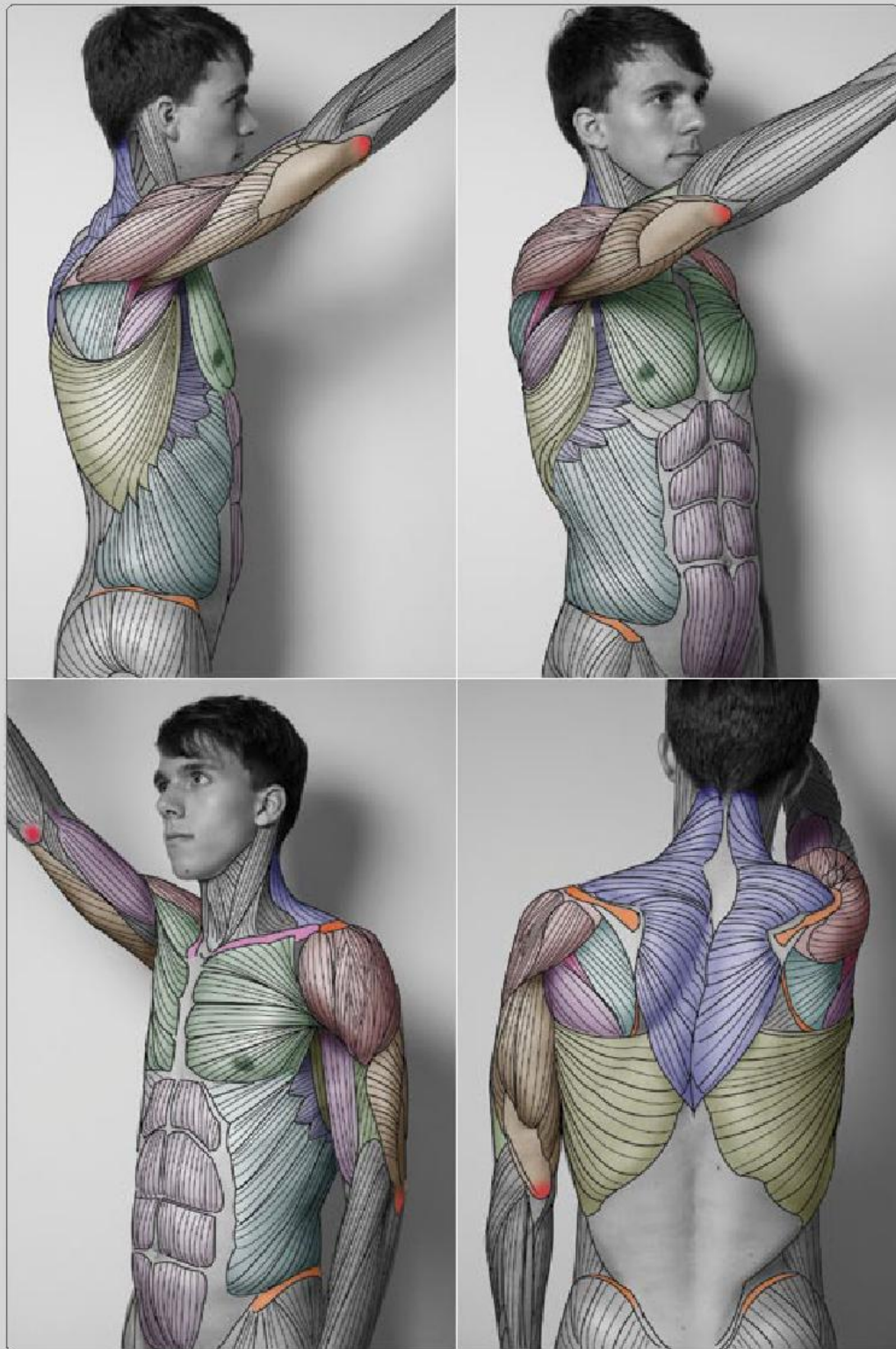
ARMS STRAIGHT UP – FEMALE



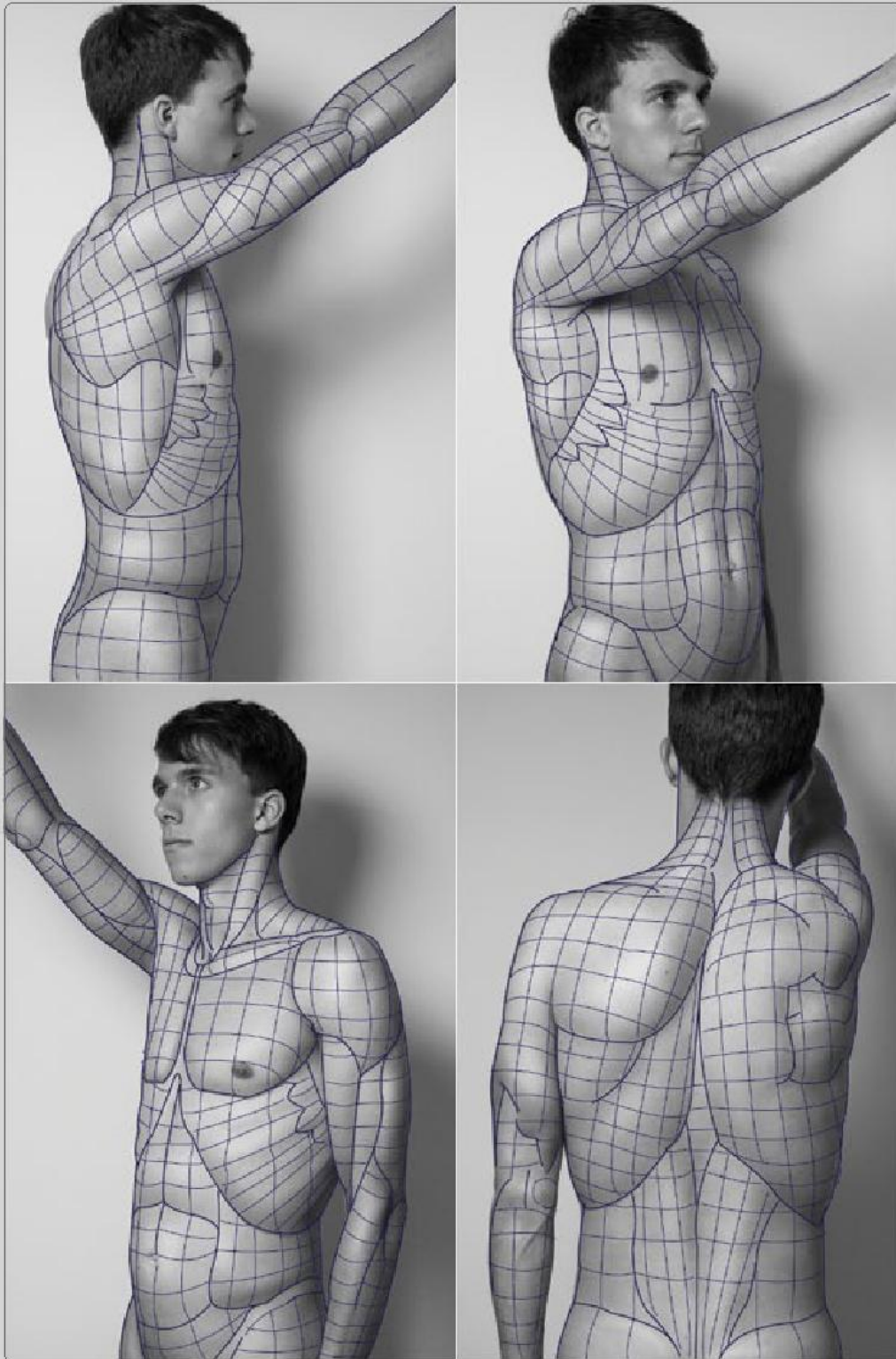
ARM REACHING UP AND FORWARD



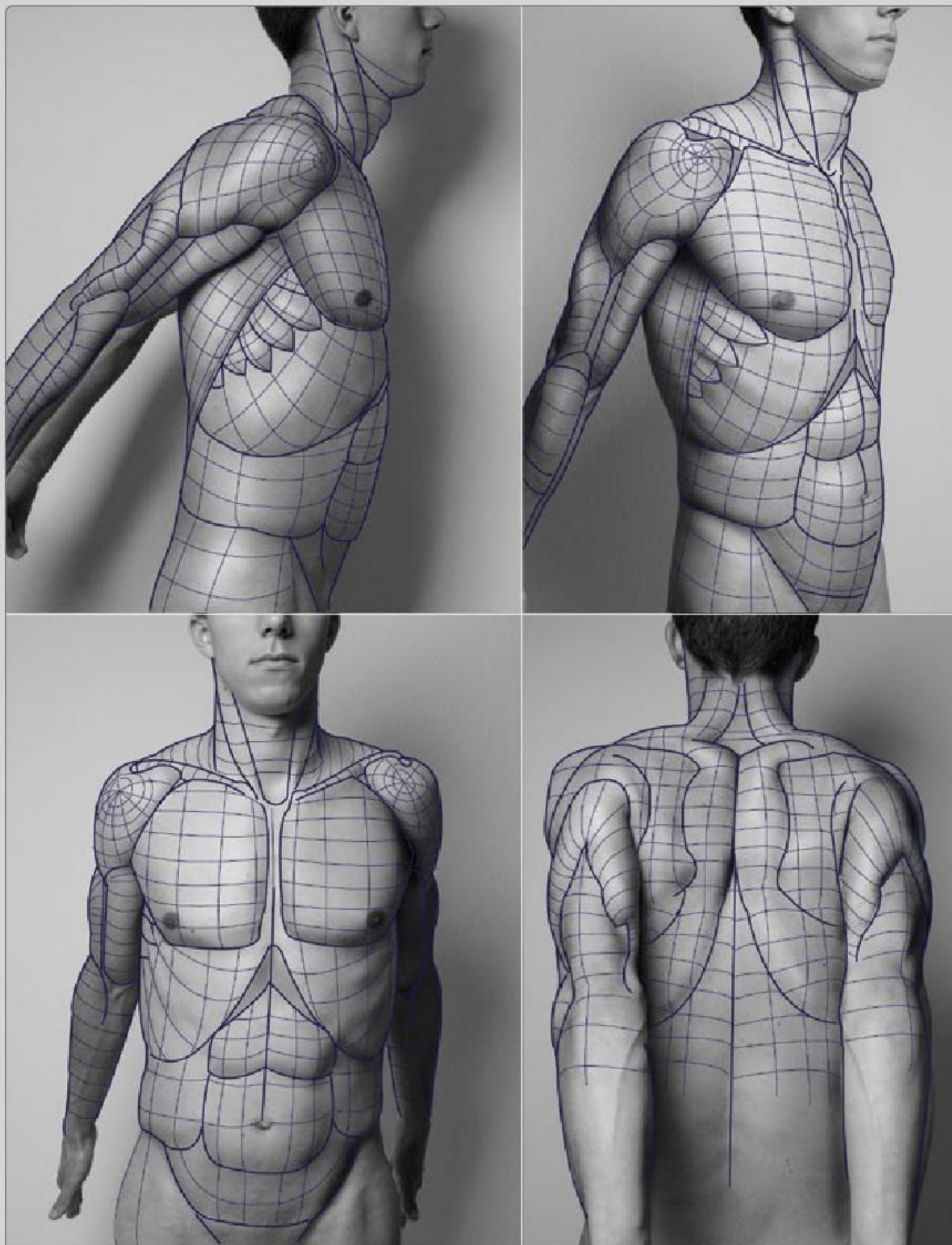
ARM REACHING UP AND FORWARD



ARM REACHING UP AND FORWARD



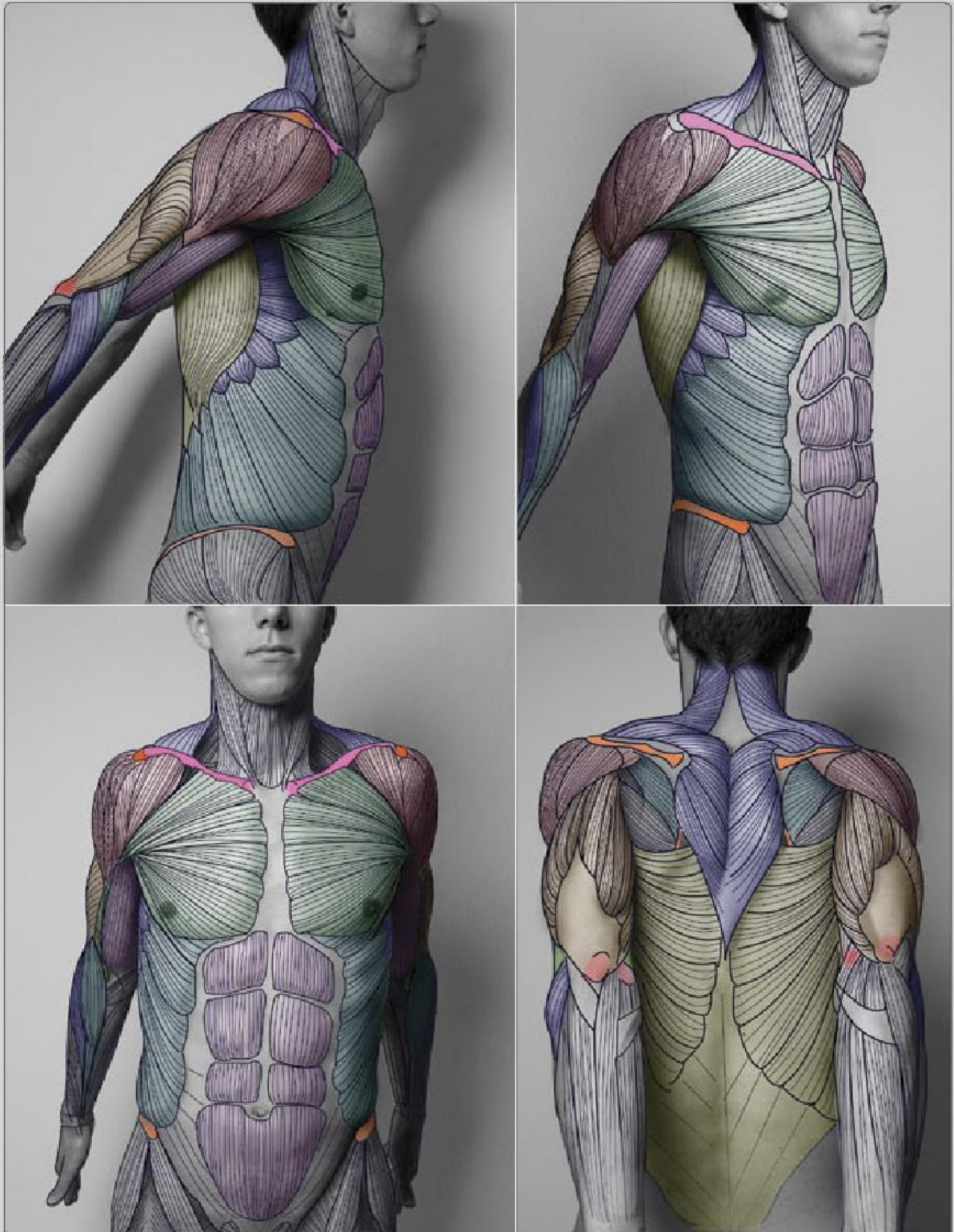
REACHING BACK



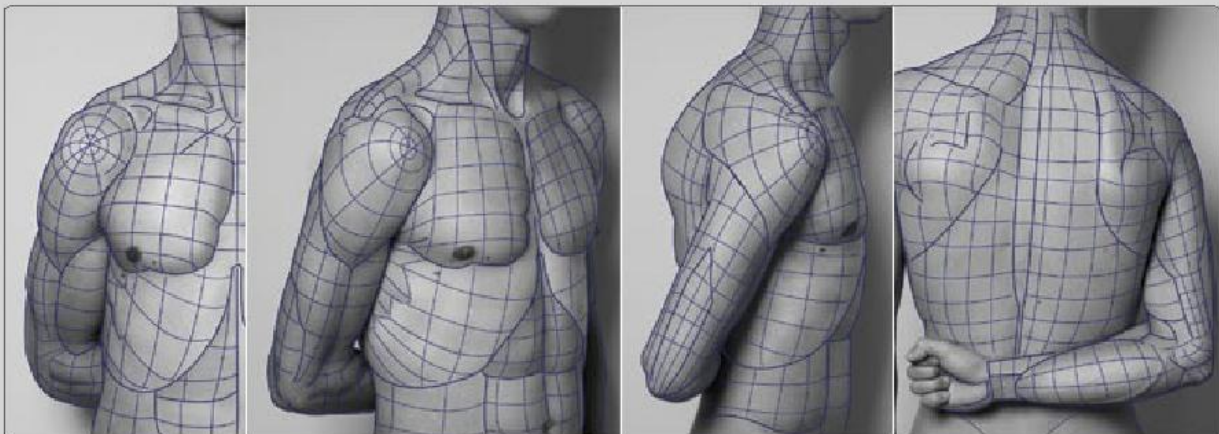
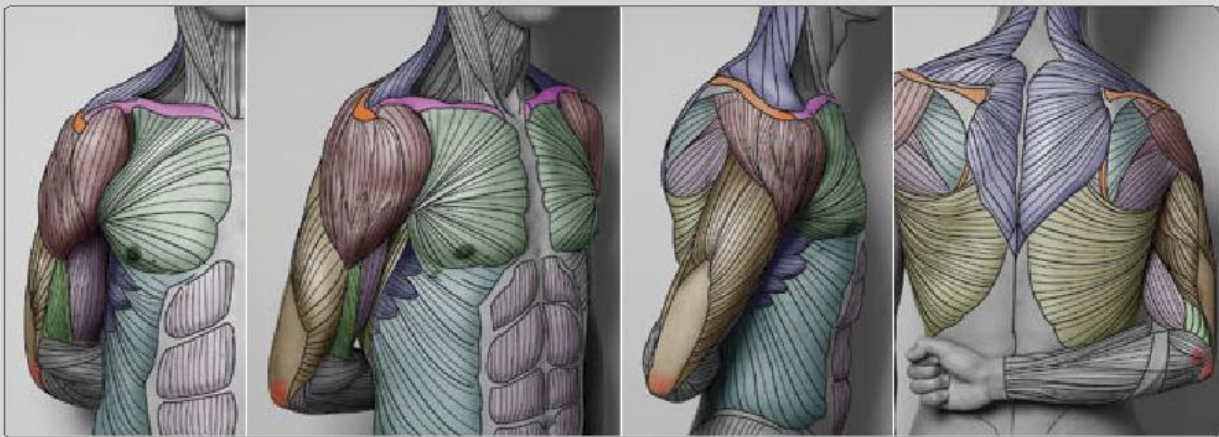
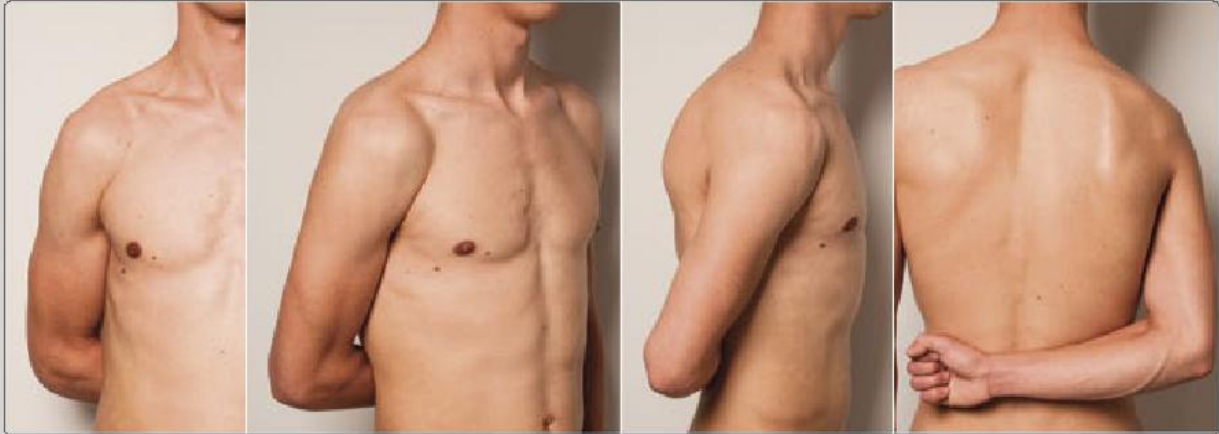
REACHING BACK



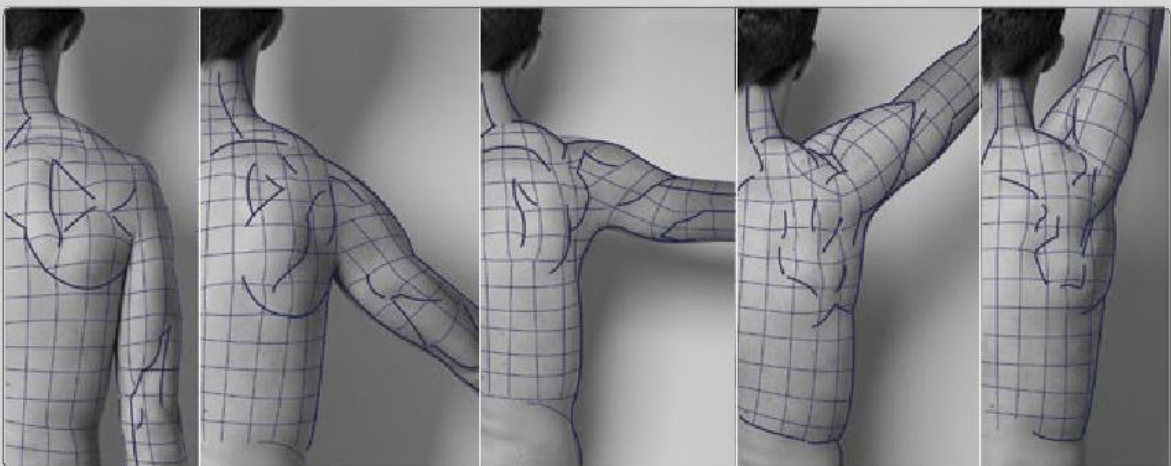
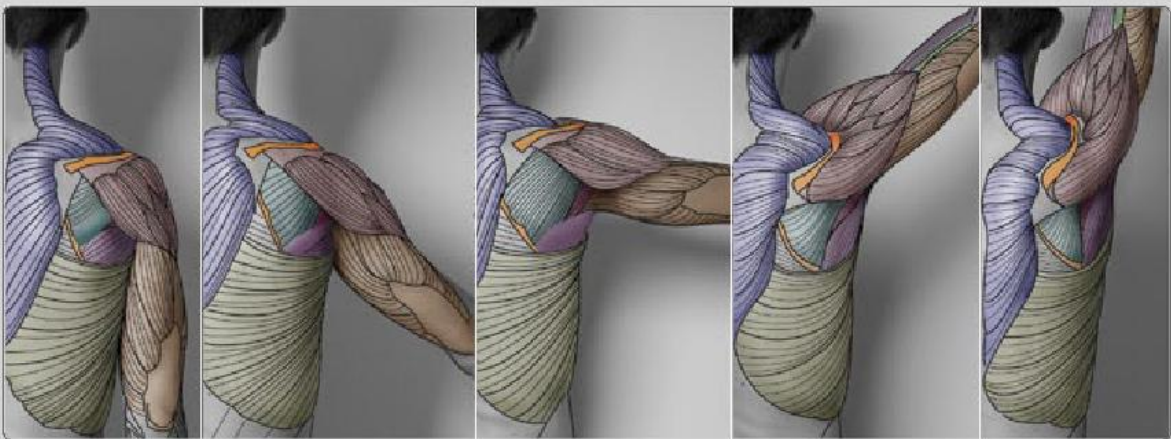
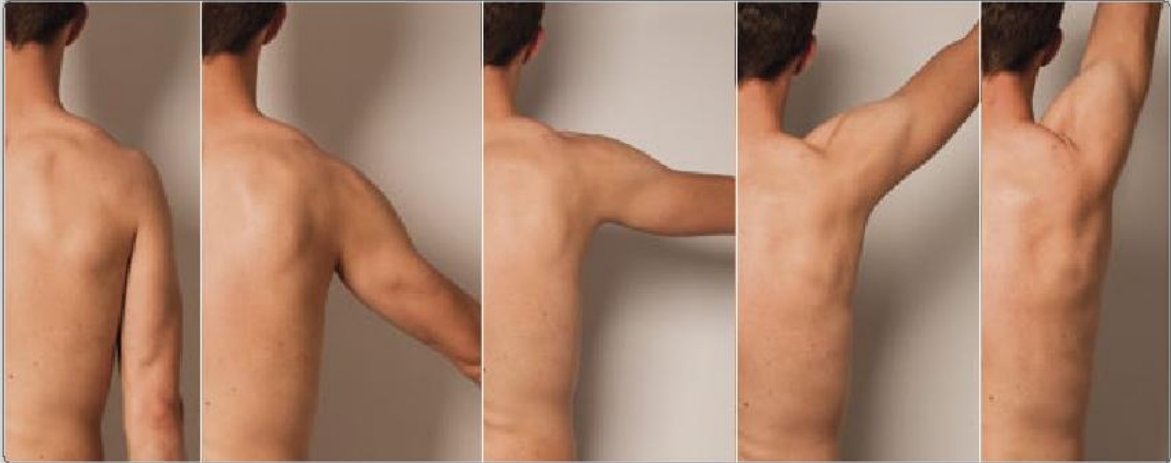
REACHING BACK



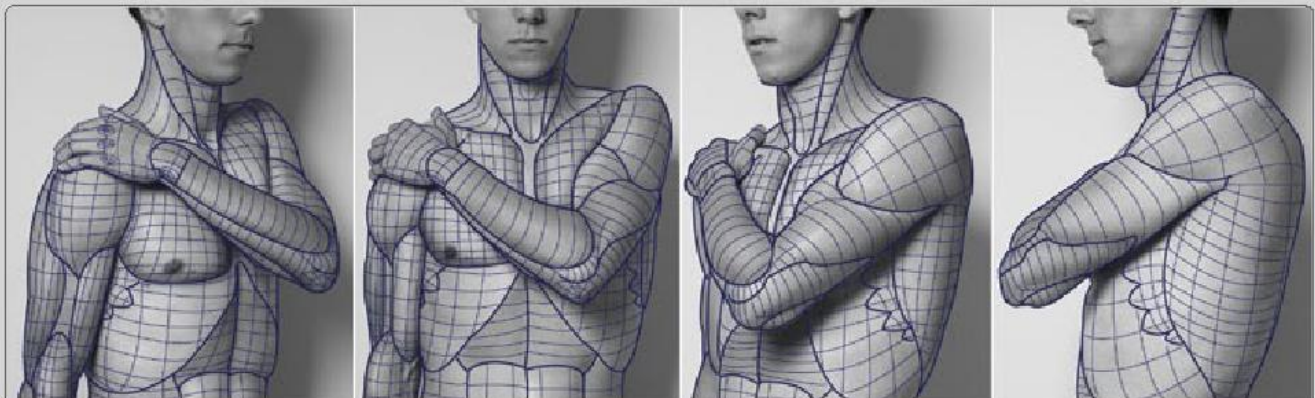
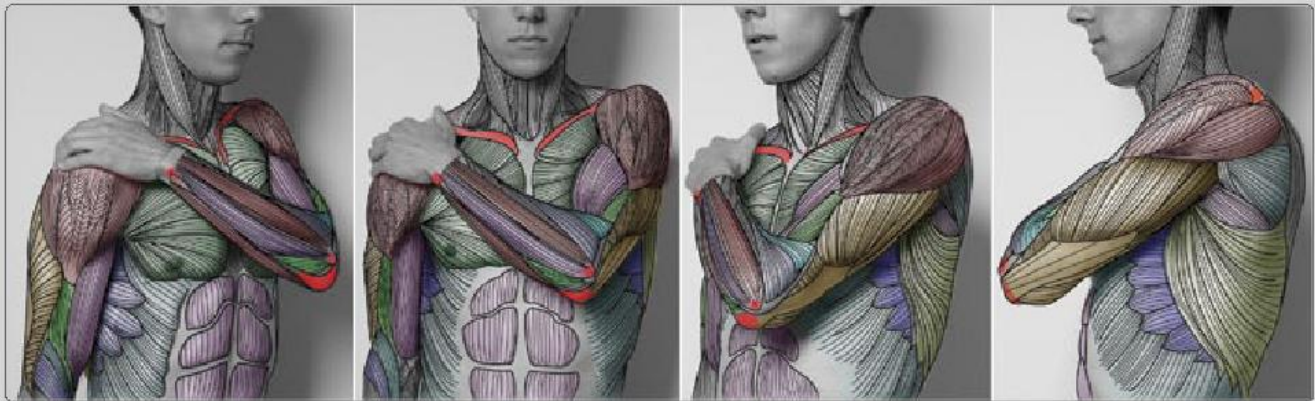
ONE ARM BEHIND BACK



LIFTING ARM HIGHER AND HIGHER



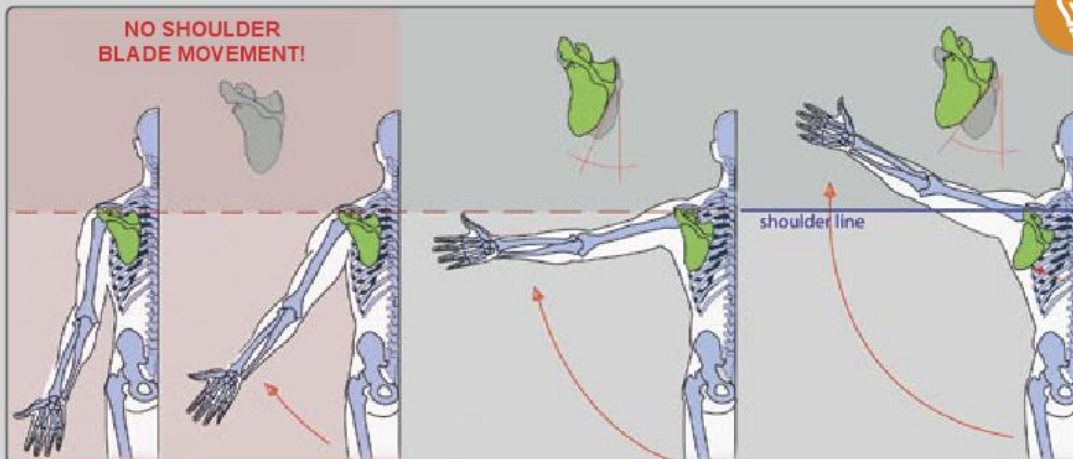
HAND HOLDING OPPOSITE SHOULDER



LET'S FIND SHOULDER BLADES (SCAPULA)!

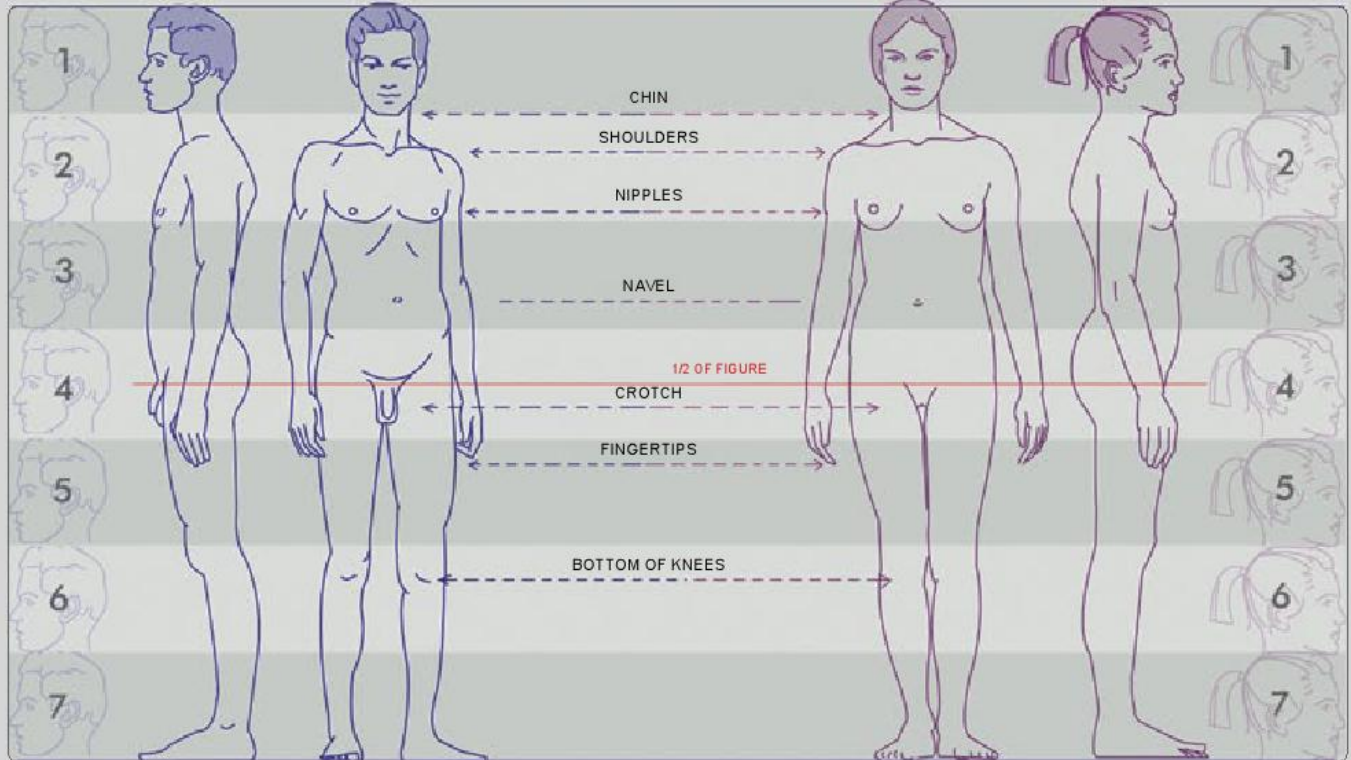


ROTATION OF THE SHOULDER BLADE

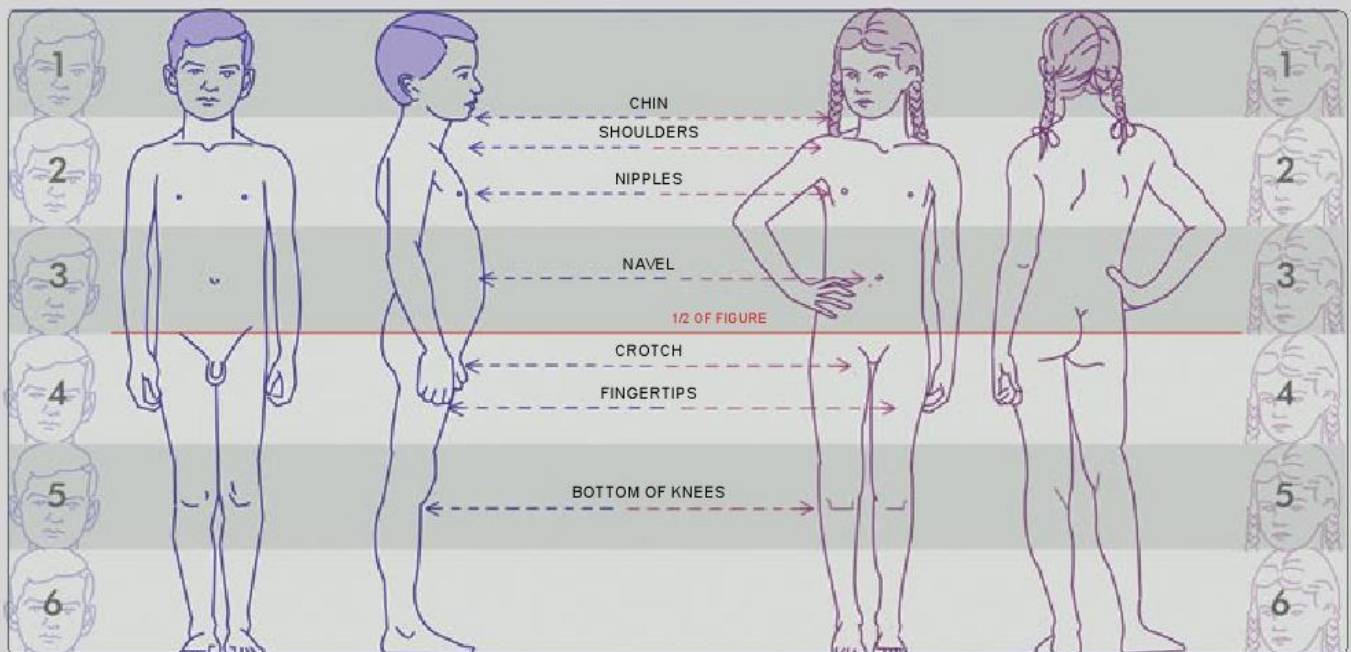


PROPORTIONS OF TEENAGER AND CHILD

TEENAGER PROPORTIONS - 7 HEAD UNITS

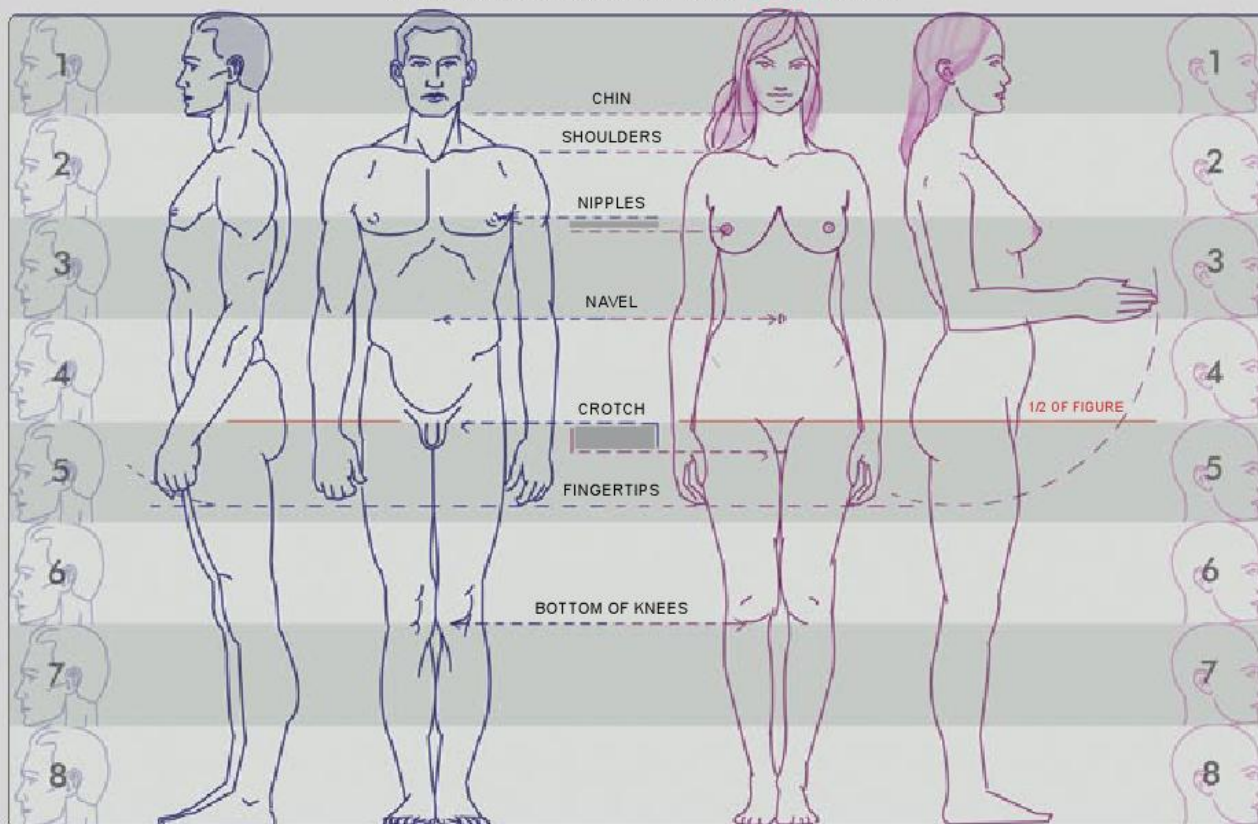


CHILD PROPORTIONS (AGES 8 - 12) - 6 HEAD UNITS

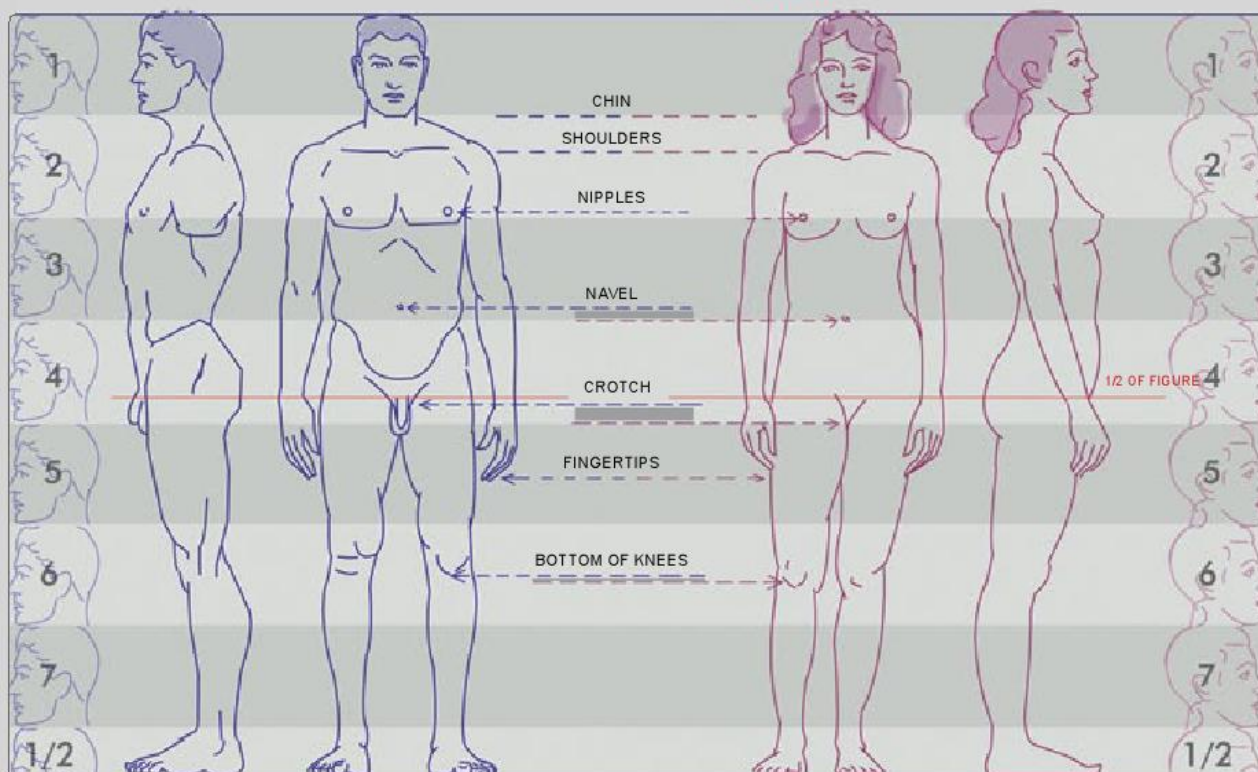


PROPORTIONS OF ADULT MALE AND FEMALE

IDEALIZED ADULT PROPORTIONS - 8 HEAD UNITS

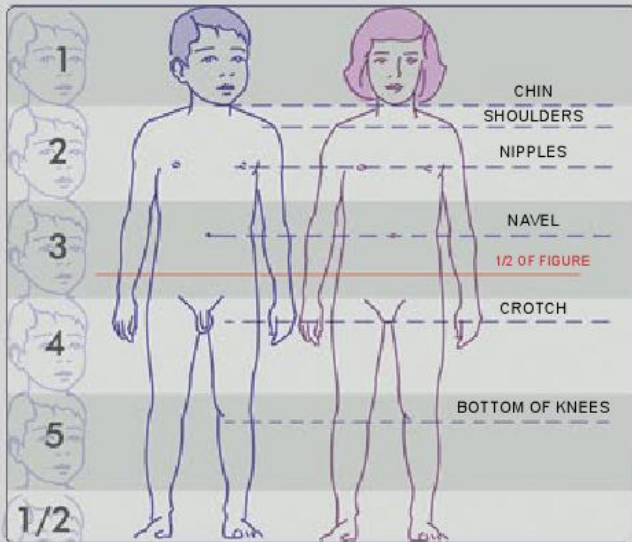


REALISTIC ADULT PROPORTIONS - 7.5 HEAD UNITS

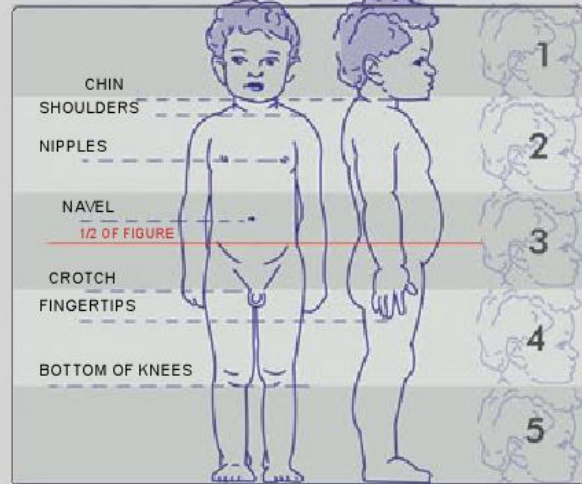


PROPORTIONS OF CHILD, TODDLER, NEWBORN AND SENIOR

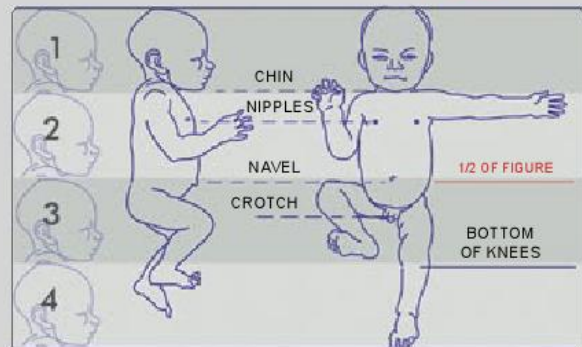
CHILD: **5.5 HEAD** UNITS



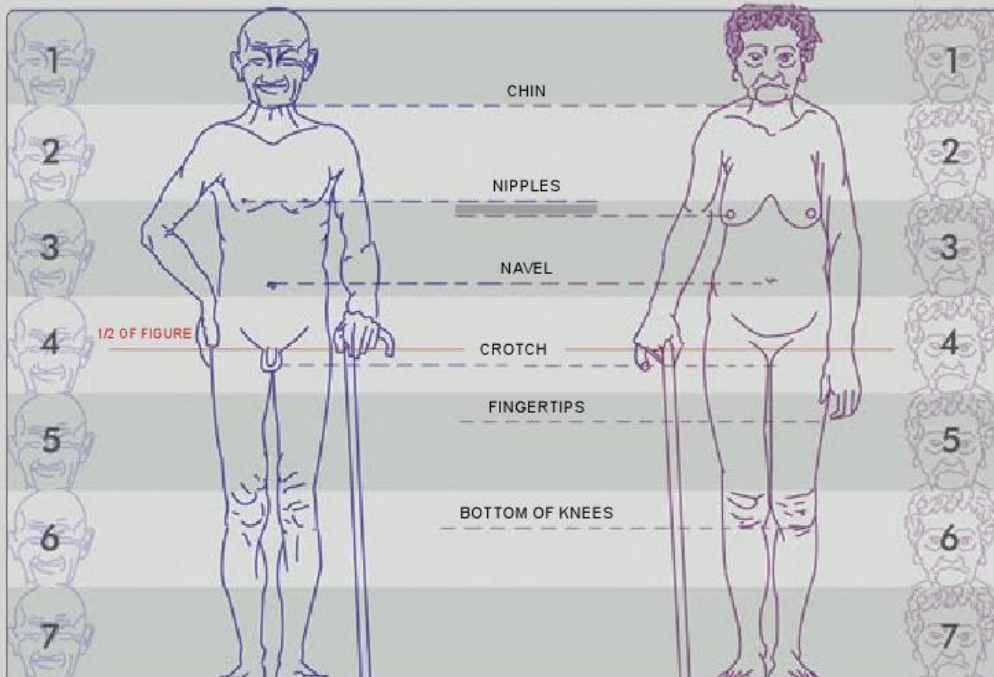
TODDLER: **5 HEAD** UNITS



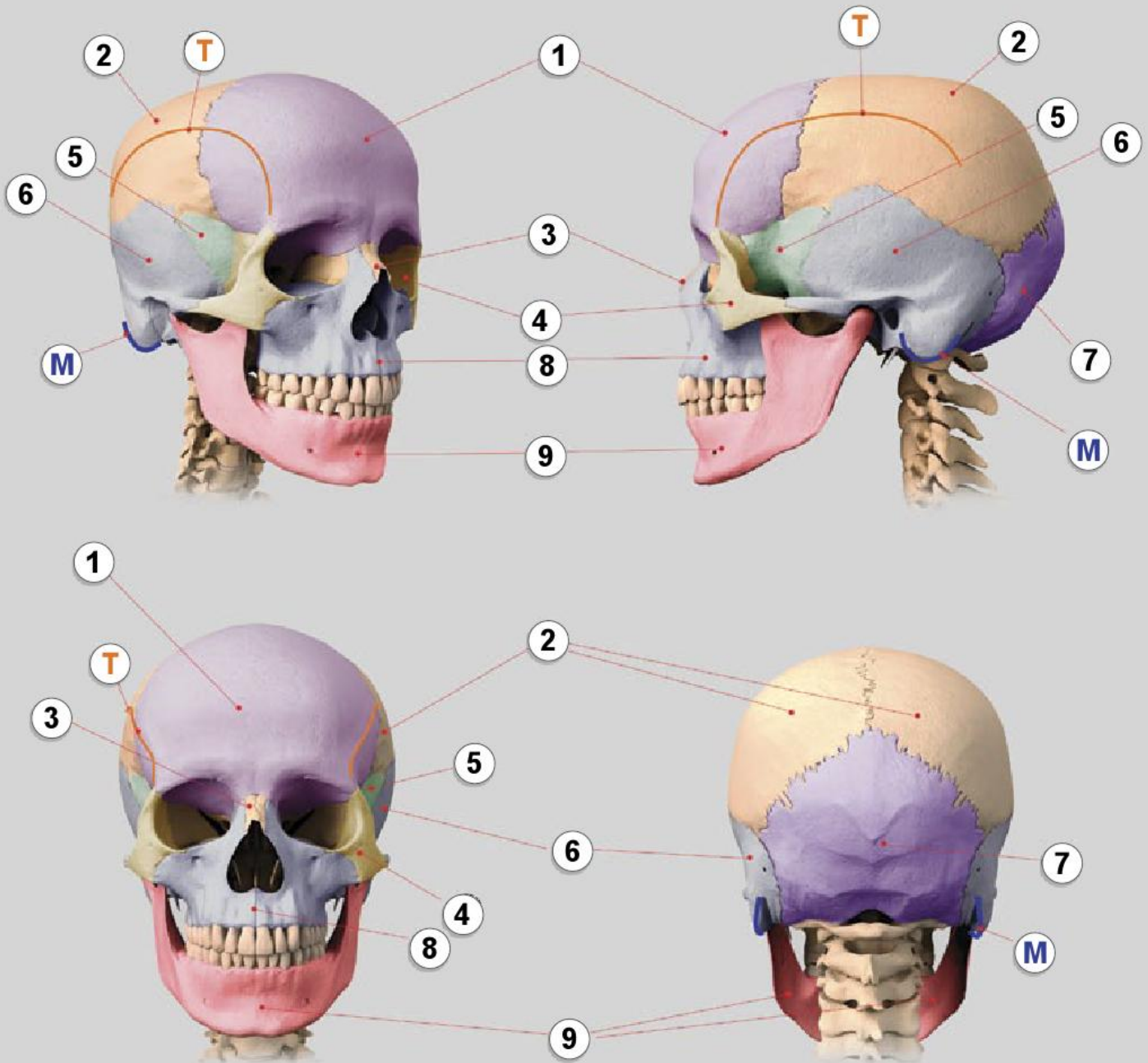
NEWBORN: **4 HEAD** UNITS



SENIOR: **7 HEAD** UNITS



MAJOR SKULL BONES



1 FRONTAL BONE

2 PARIETAL BONE

3 NASAL BONE

T TEMPORAL LINE

4 ZYGOMATIC BONE

5 SPHENOID BONE

6 TEMPORAL BONE

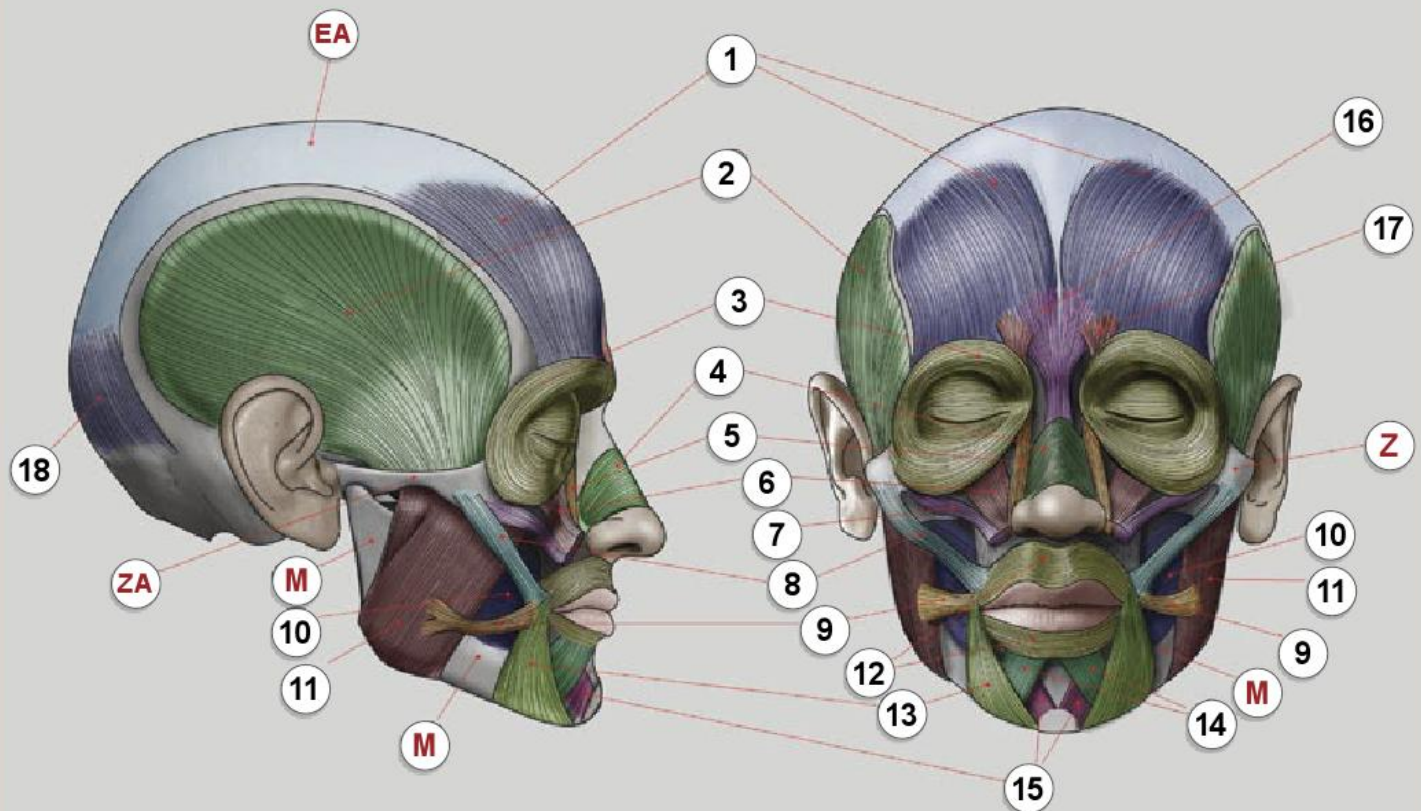
M MASTOID PROCESS

7 OCCIPITAL BONE

8 MAXILLA BONE

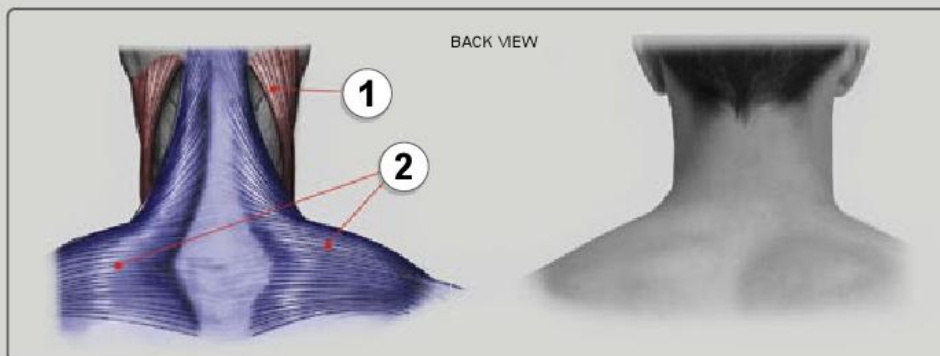
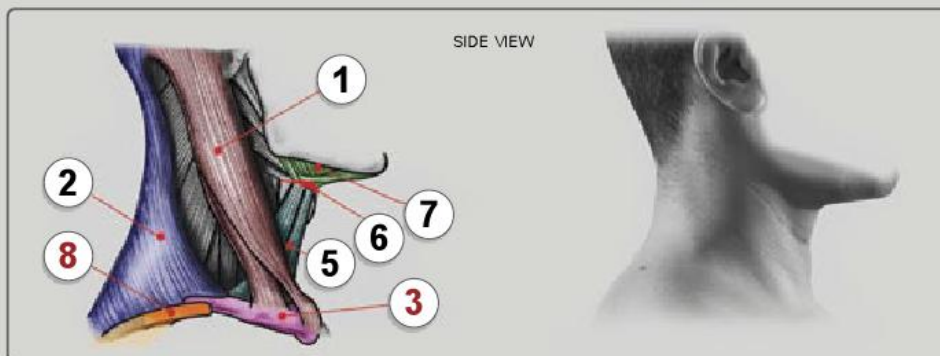
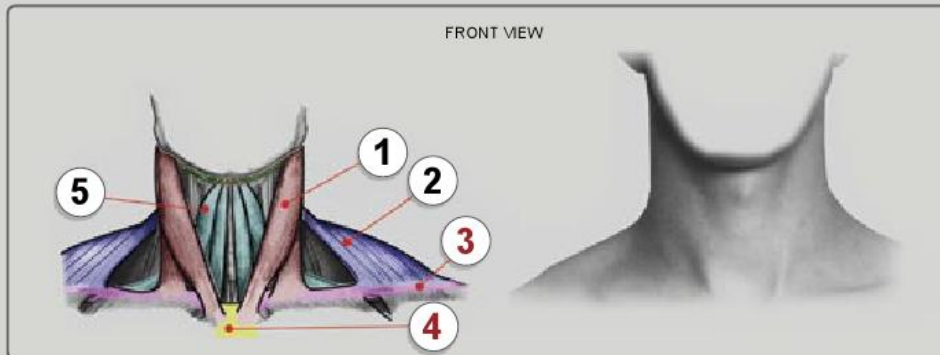
9 MANDIBLE BONE

MAJOR HEAD MUSCLES



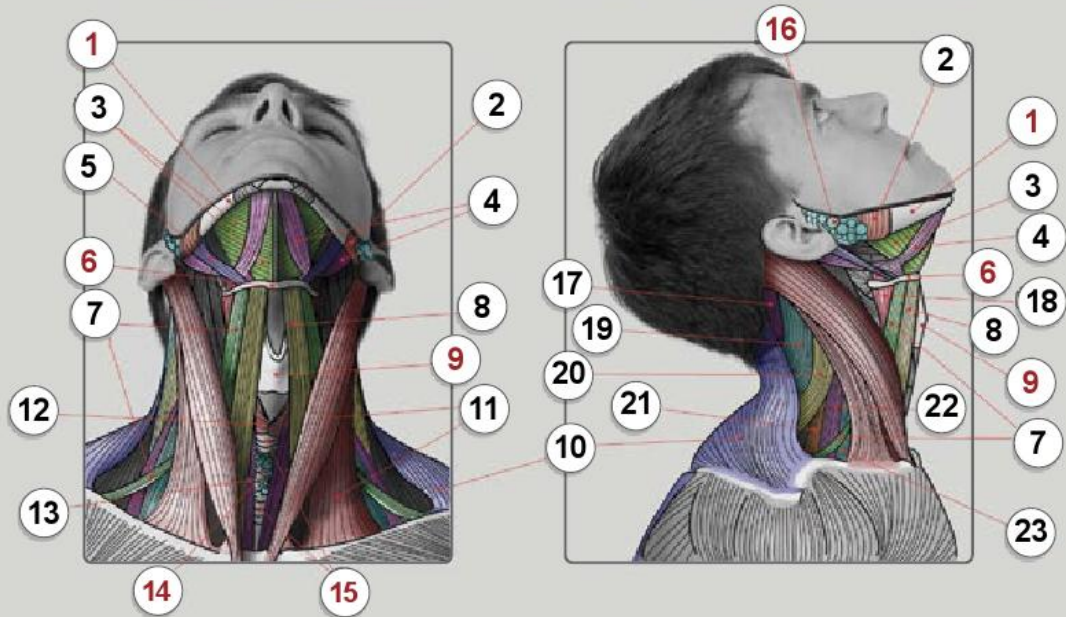
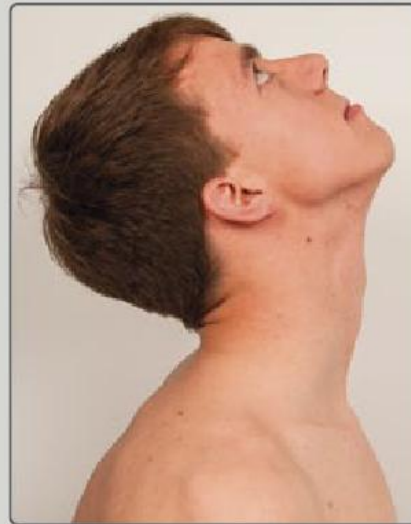
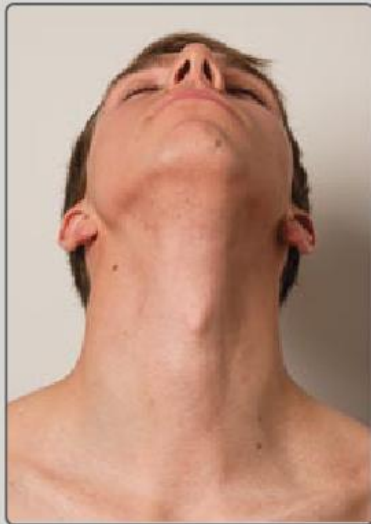
- | | |
|--|---|
| 1 FRONTALIS MUSCLE | 11 MASSETER MUSCLE |
| 2 TEMPORAL MUSCLE | 12 ORBICULARIS ORIS MUSCLE |
| 3 ORBICULARIS OCULI MUSCLE | 13 DEPRESSOR ANGULI ORIS MUSCLE |
| 4 NASALIS MUSCLE | 14 DEPRESSOR LABII INFERIORIS MUSCLE |
| 5 OTTO'S MUSCLE | 15 MENTALIS MUSCLE |
| 6 LEVATOR LABII SUPERIORIS MUSCLE | 16 PROCERUS MUSCLE |
| 7 ZYGOMATICUS MINOR MUSCLE | 17 CORRUGATOR MUSCLE |
| 8 ZYGOMATICUS MAJOR MUSCLE | 18 OCCIPITALIS MUSCLE |
| 9 RISORII MUSCLE | Z ZYGOMATIC BONE |
| 10 BUCCINATOR MUSCLE | ZA ZYGOMATIC ARCH |
| M MANDIBLE (LOWER JAW) | EA EPICRANIAL APONEUROSIS |

MAIN NECK MUSCLES



- | | | |
|---------------------------------|-------------------------------|-----------------------------------|
| 1 STERNOCLEIDOMASTOID | 4 CHEST BONE (STERNUM) | 7 SUPRAHYOID MUSCLES |
| 2 TRAPEZIUS | 5 INFRAHYOID MUSCLES | 8 SHOULDER BLADE (SCAPULA) |
| 3 COLLAR BONE (CLAVICLE) | 6 HYOID BONE | |

MAIN NECK MUSCLES



1 LOWER JAW (MANDIBLE)

2 MASSETER

3 MYLOHYOID

4 DIGASTRIC

5 STYLOHYOID

6 HYOID BONE

7 OMOHYOID

8 STERNOHYOID

9 ADAM'S APPLE (LARYNGEAL PROMINENCE)

10 TRAPEZIUS

11 STERNOCLEIDOMASTOID

12 CRICOTHYROID

13 STERNOTHYROID

14 THYROID GLAND

15 TRACHEA

16 PAROTID GLAND

17 SEMISPINALIS CAPITIS

18 HYOGLOSSUS

19 SPLENIUS CAPITIS

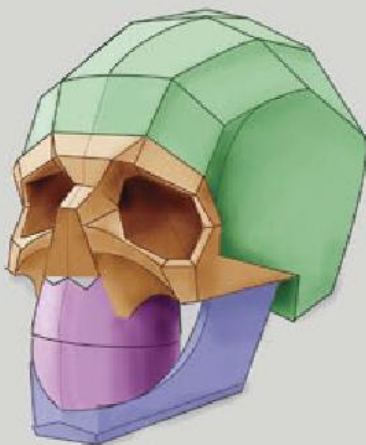
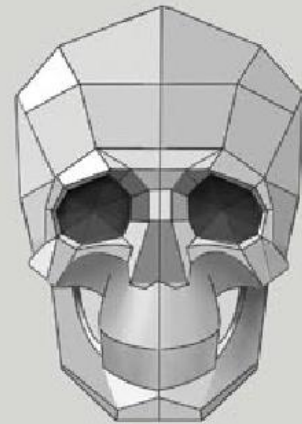
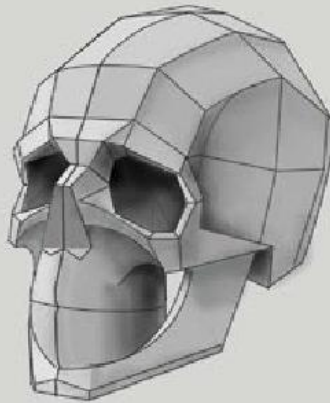
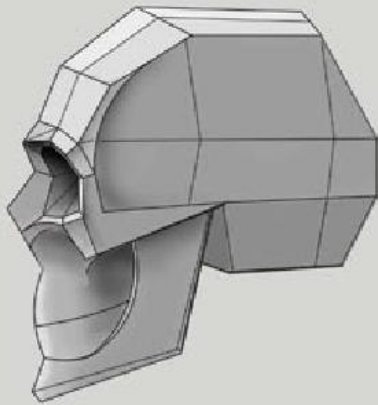
20 LEVATOR SCAPULAE

21 SCALENUS POSTERIOR

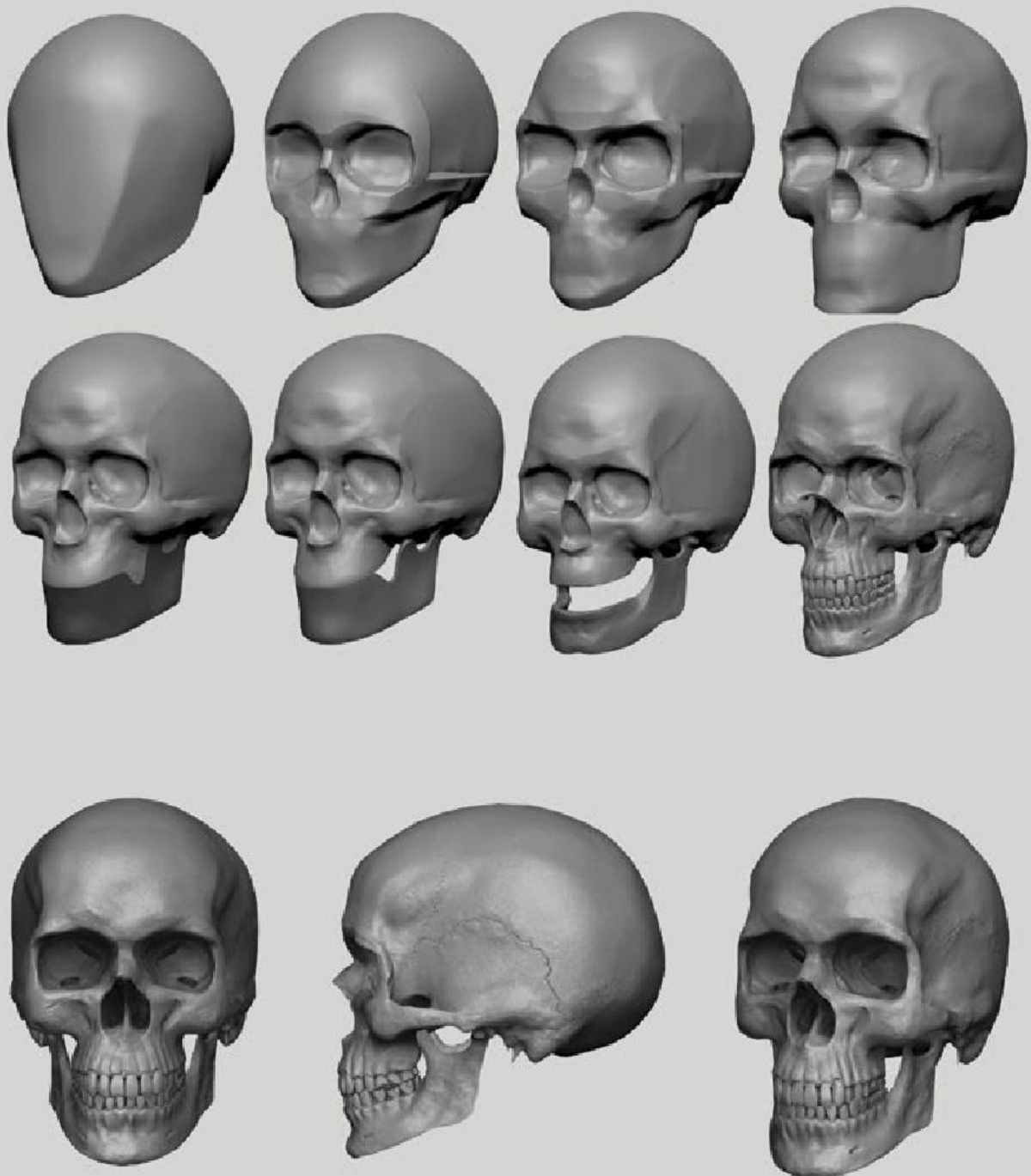
22 SCALENUS MEDIUS

23 SCALENUS ANTERIOR

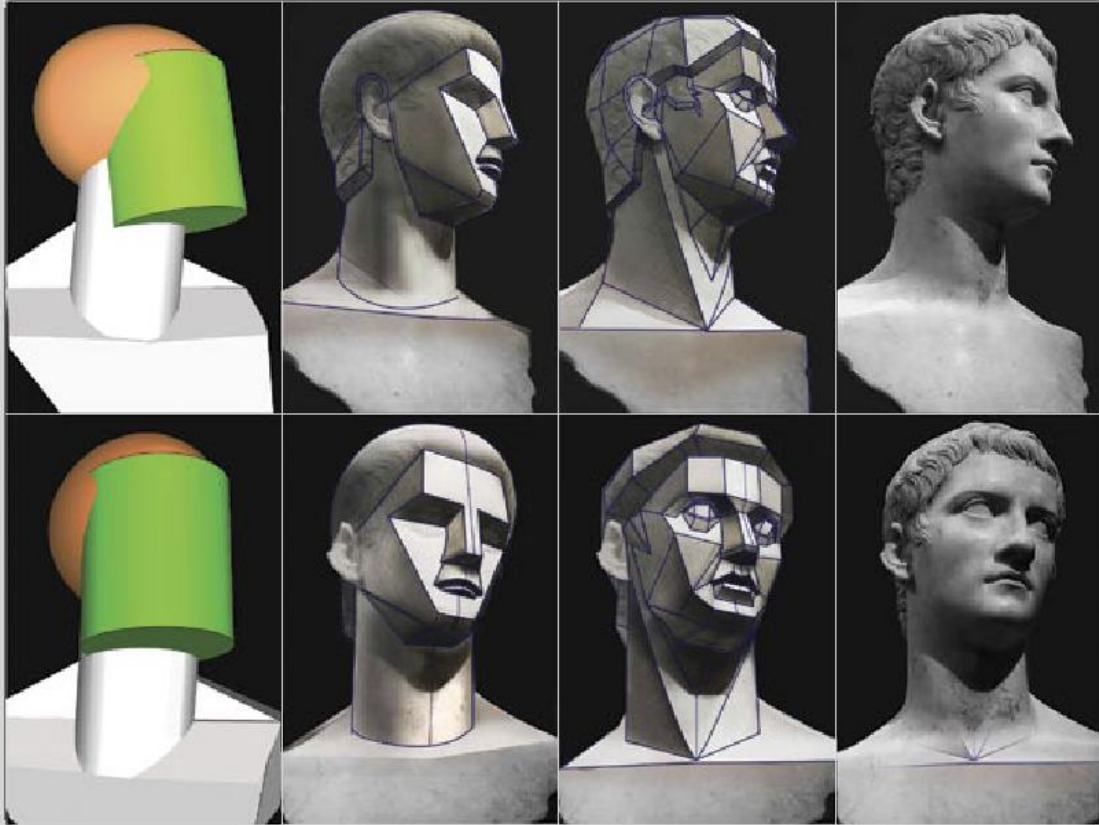
SHAPES THAT FORM A SKULL



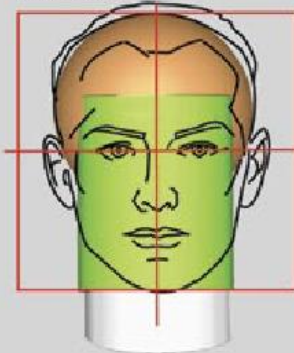
MODELING A 3D SKULL



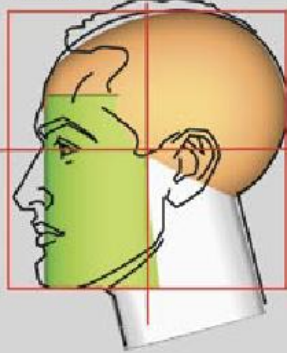
HEAD SHAPE AND MASSES



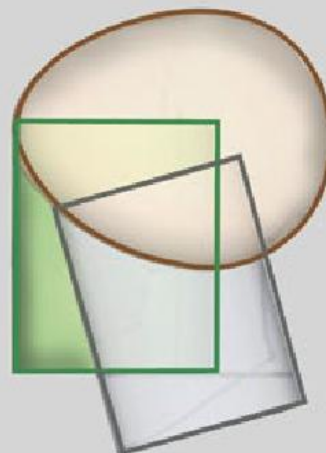
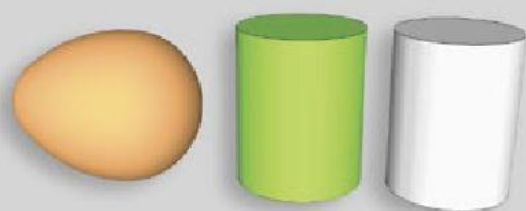
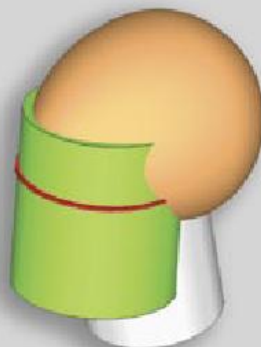
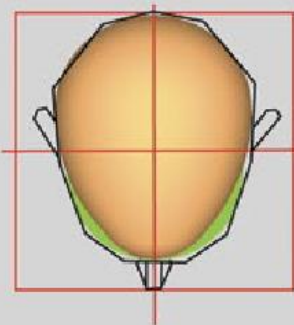
FRONT VIEW



SIDE VIEW



TOP VIEW

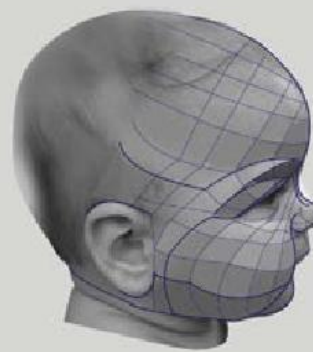
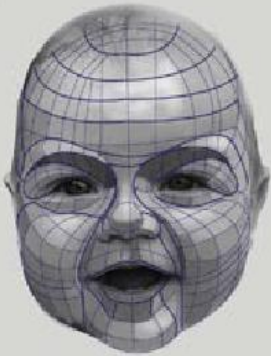


BABY HEAD

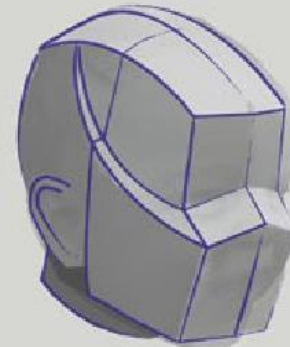
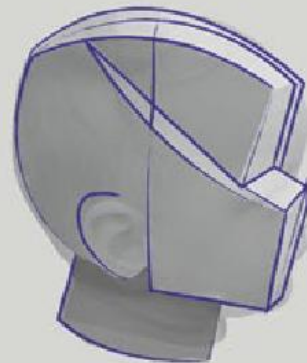
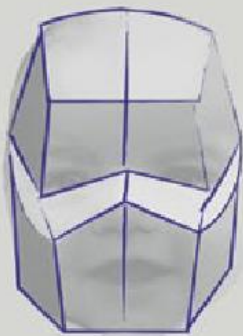
REAL



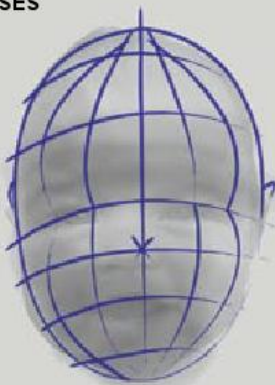
MESH



BLOCK-OUT

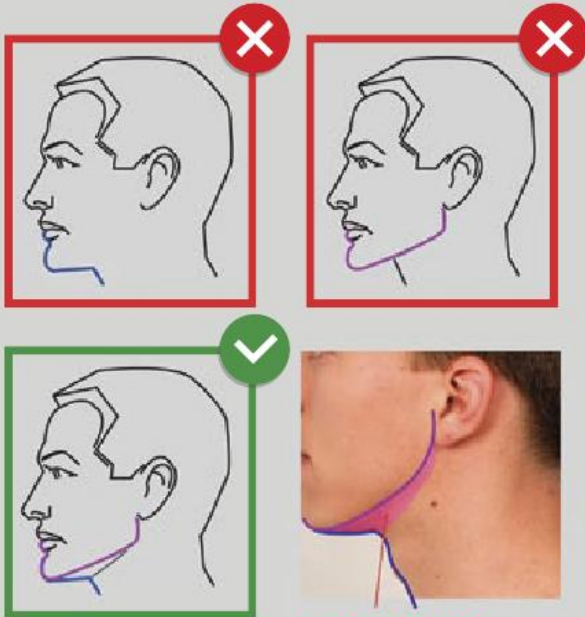


MASSES



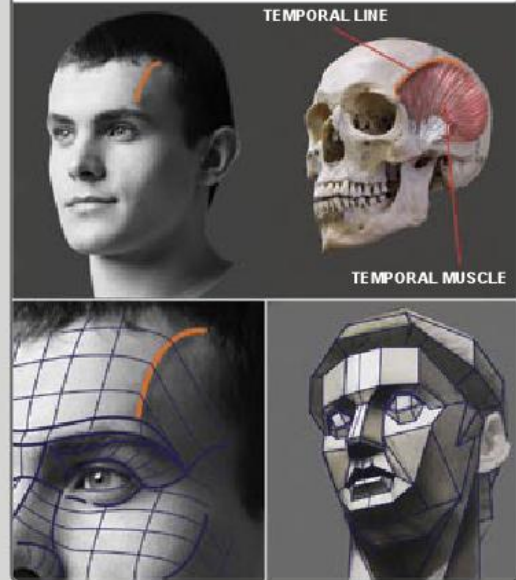
THE HEAD SHAPE

CONTOUR OF THE CHIN
IS NOT THE SAME AS JAWLINE.



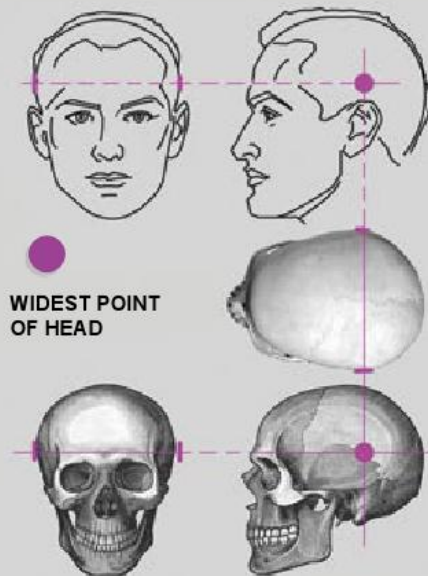
SUPRAHYOID MUSCLES

TEMPORAL LINE (THE EDGE BETWEEN
TEMPORAL BONE AND FOREHEAD PLANE).



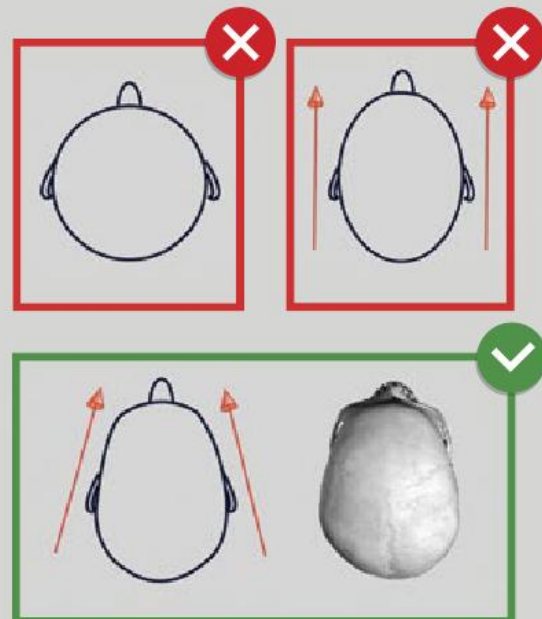
TEMPORAL LINE

TEMPORAL MUSCLE

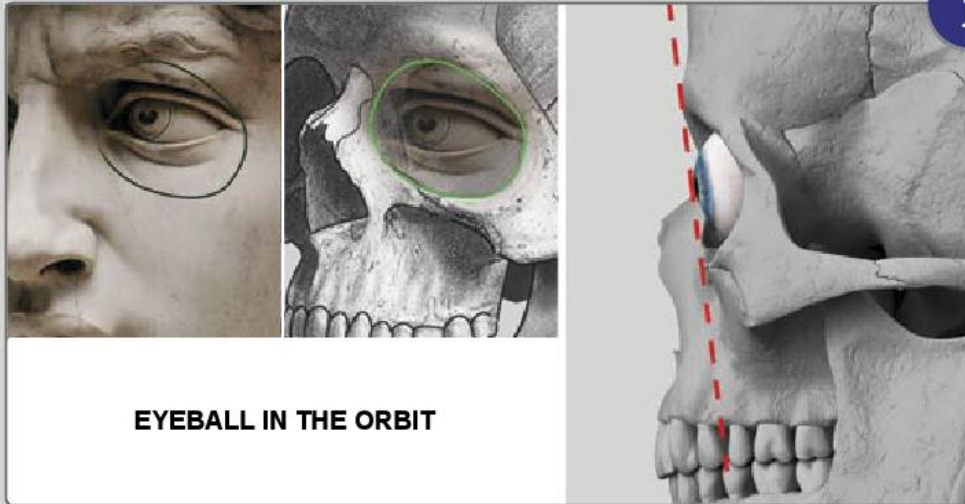


WIDEST POINT
OF HEAD

HEAD IS NOT ROUND.



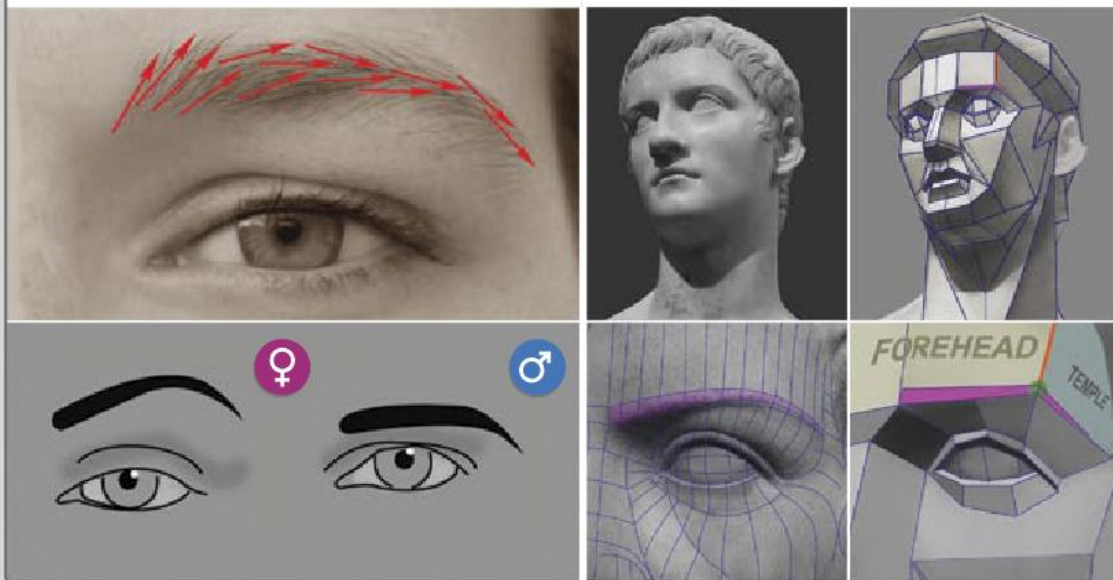
FRAMING THE EYES



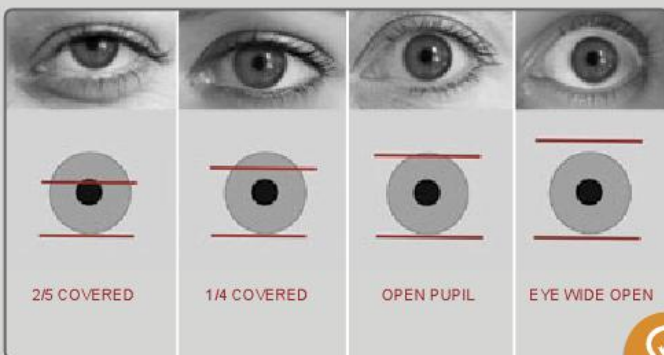
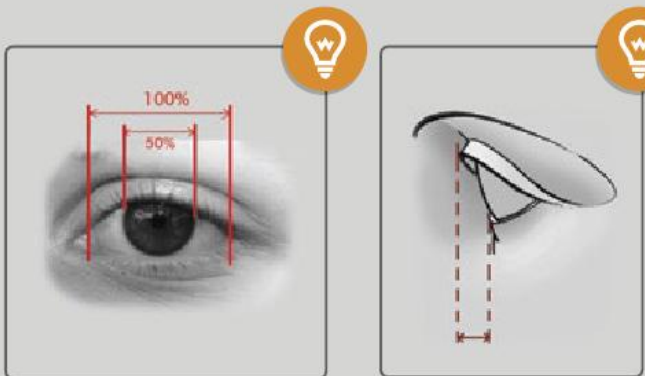
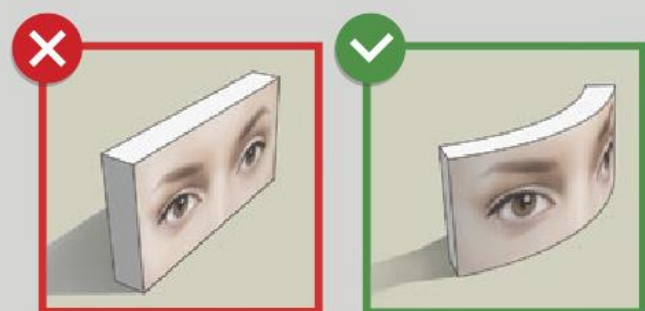
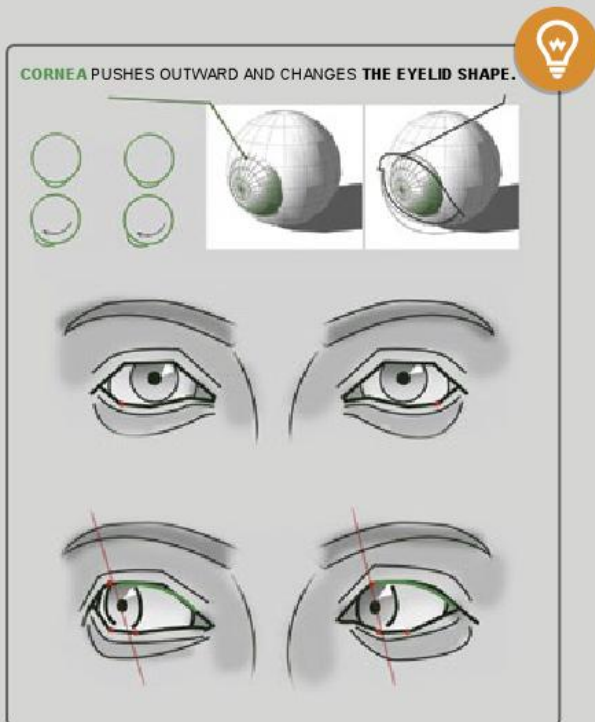
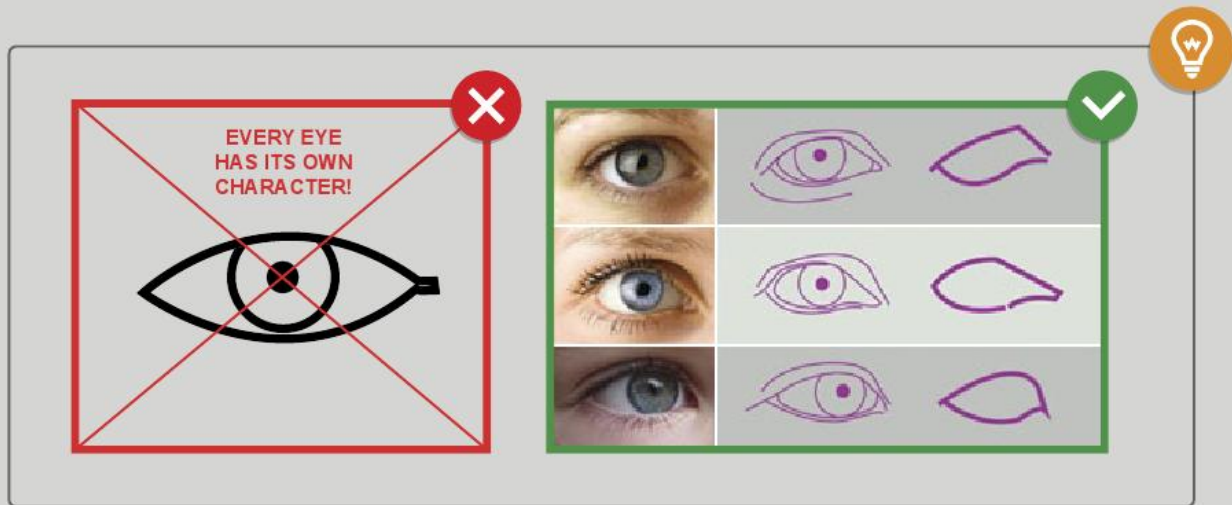
EYEBROWS



EYEBROW CHANGES DIRECTION AS IT RUNS ACROSS **THE TEMPORAL LINE**, SLOPING DOWN AND BACK TOWARD THE EAR.

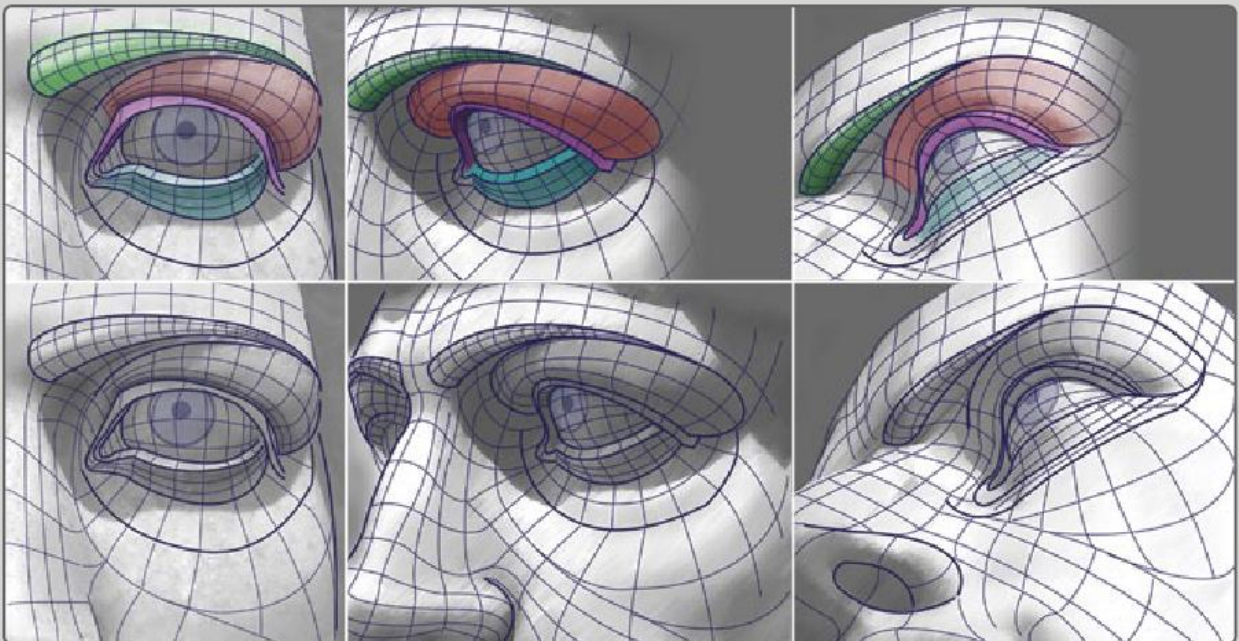
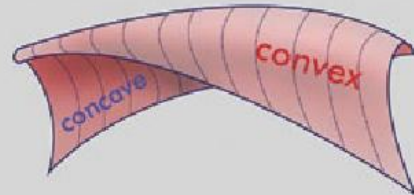
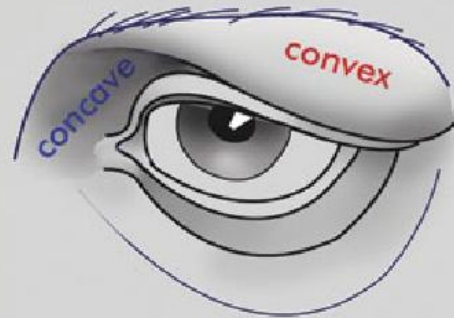
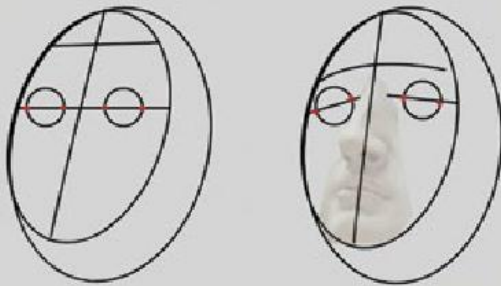


ALL ABOUT EYES



EYE

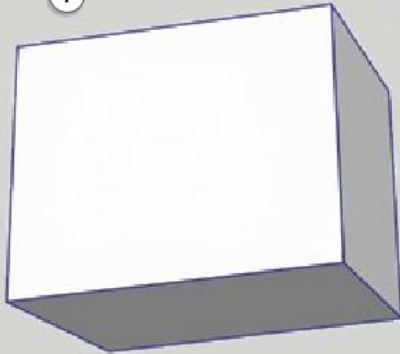
WHAT MAKES A FACE LOOK FLAT?



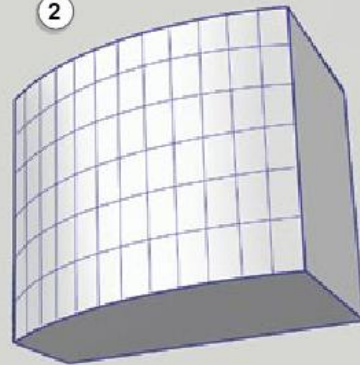
BLOCKING-OUT A CLASSICAL EYE (STEP-BY-STEP)



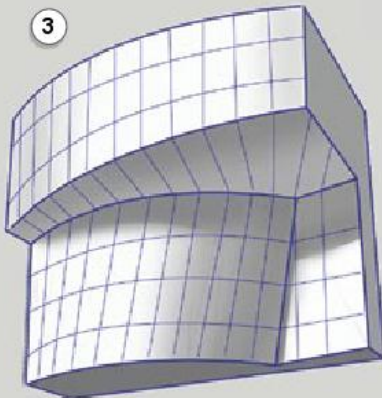
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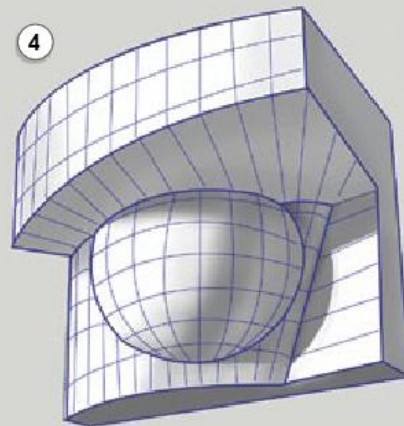
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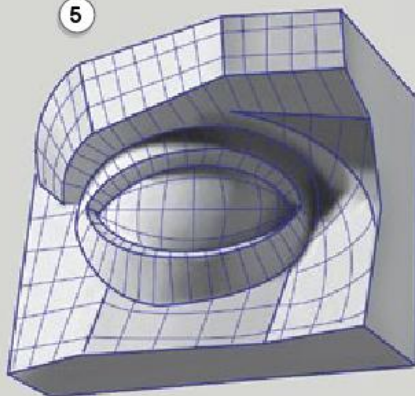
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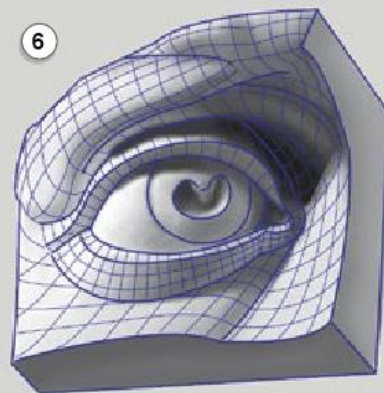
4



5



6



EYES COME IN A VARIETY OF SHAPES

ADULT FEMALE



ADULT MALE



BABY



CHILD



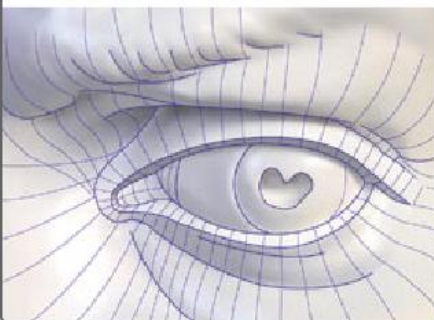
ASIAN



BLACK



CLASSICAL SCULPTURE



SENIOR



EYE MOVEMENTS (EXPRESSIONS)

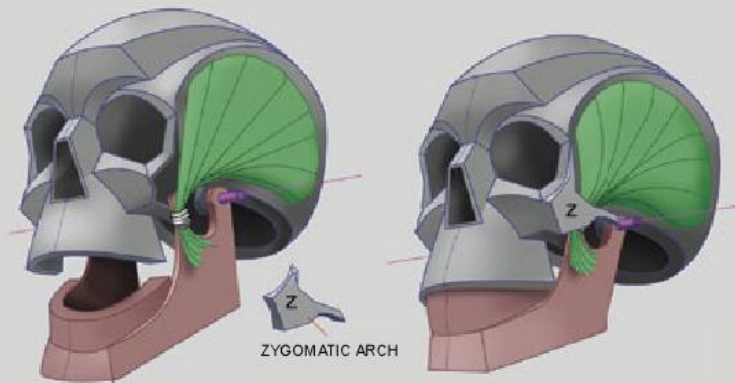


EYE MOVEMENTS (EXPRESSIONS)

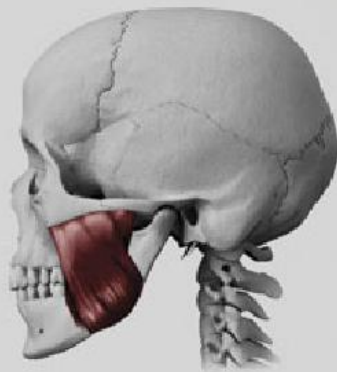


WHAT STRONG JAWS YOU HAVE!

TEMPORALIS MUSCLE – HELPS TO CLOSE THE MOUTH AND KEEP IT SHUT!

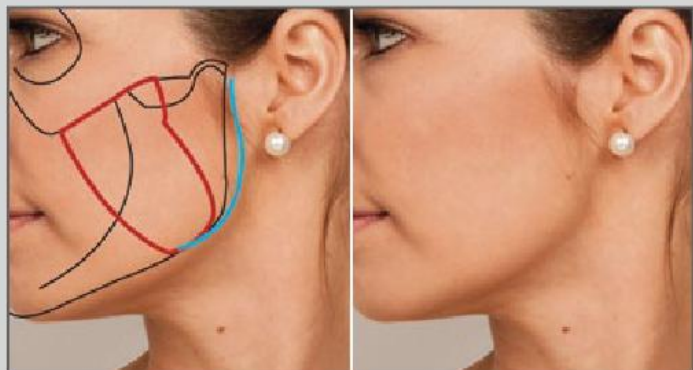
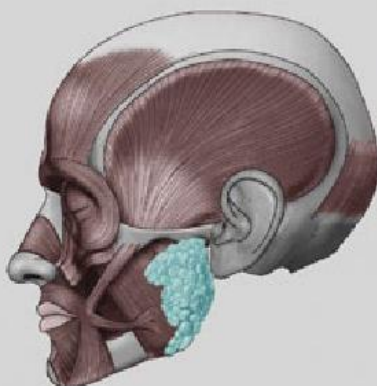


THE CHEWING MUSCLE (MASSETER MUSCLE).

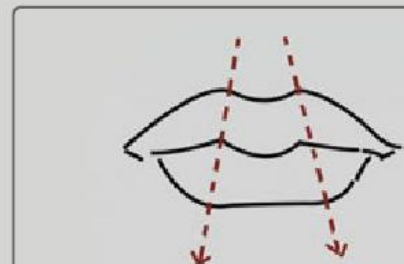
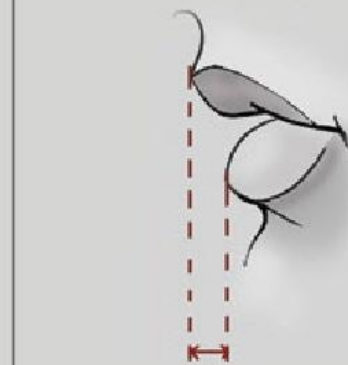
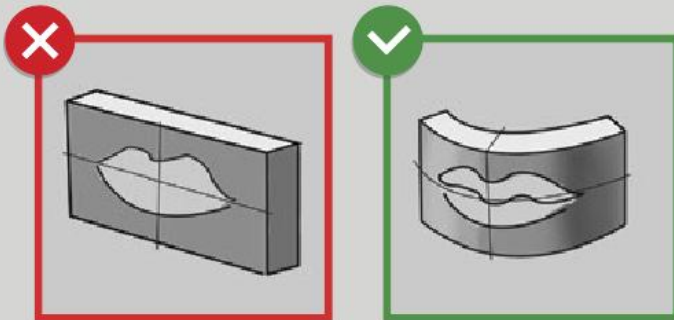
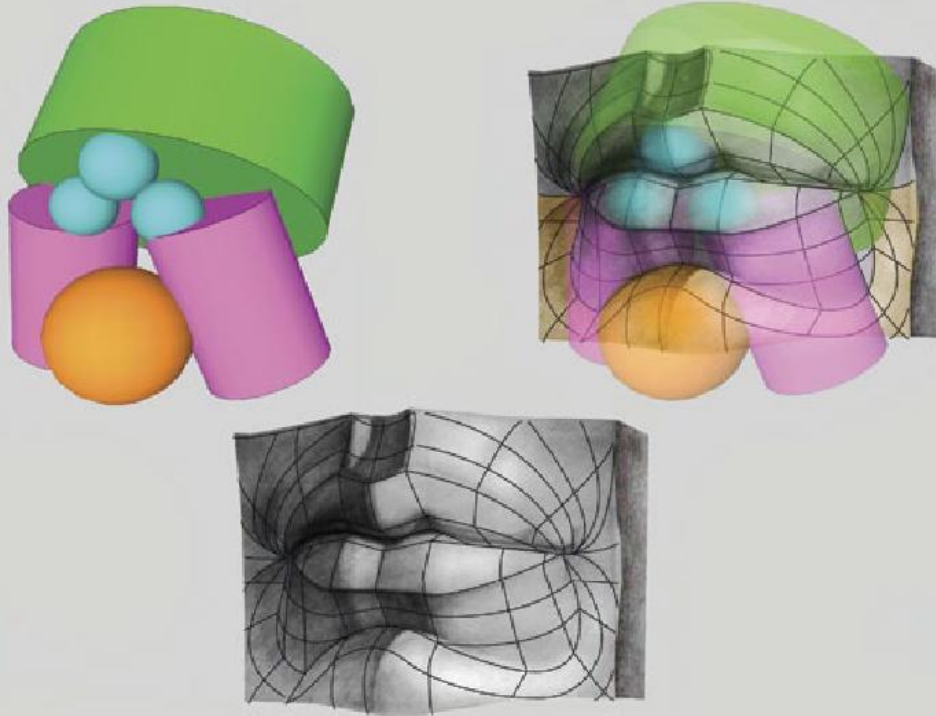


IT IS THE PRIMARY CHEWING MUSCLE AND PULLS THE JAWS CLOSED. ITS OUTER PORTION ORIGINATES FROM THE ZYGOMATIC ARCH AND INSERTS ON THE SURFACE OF THE RAMUS OF THE MANDIBLE.

PAROTID GLAND (SALIVARY GLAND) ALSO PLAYS IMPORTANT ROLE IN SHAPING THE JAWLINE AND FACE.

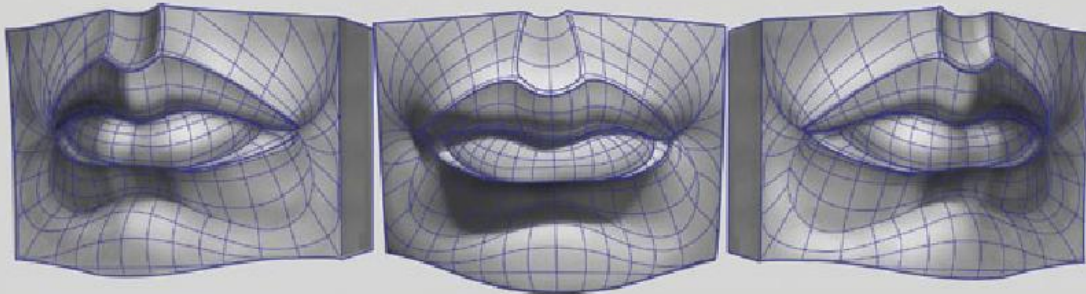


UNDERSTANDING MOUTH CURVATURE

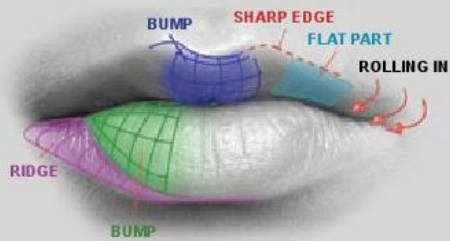


SHAPE OF STILL LIPS

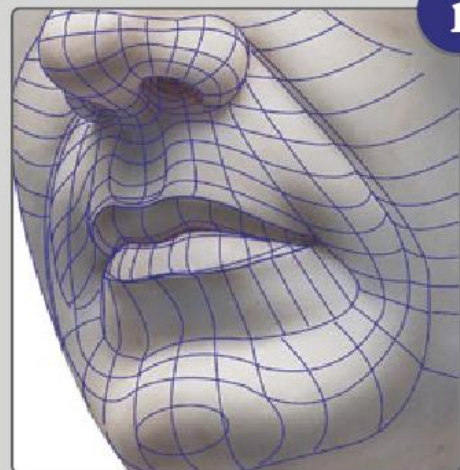
i



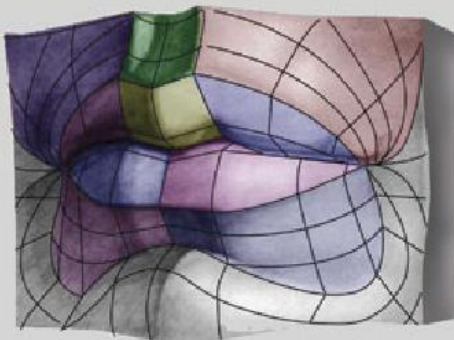
i



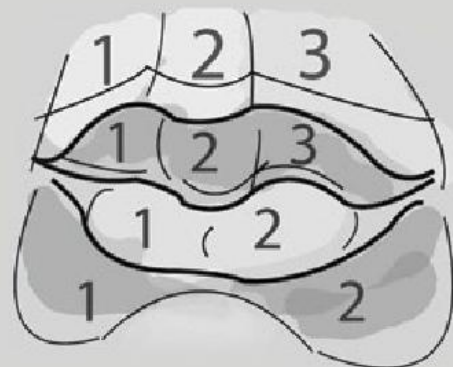
i



i



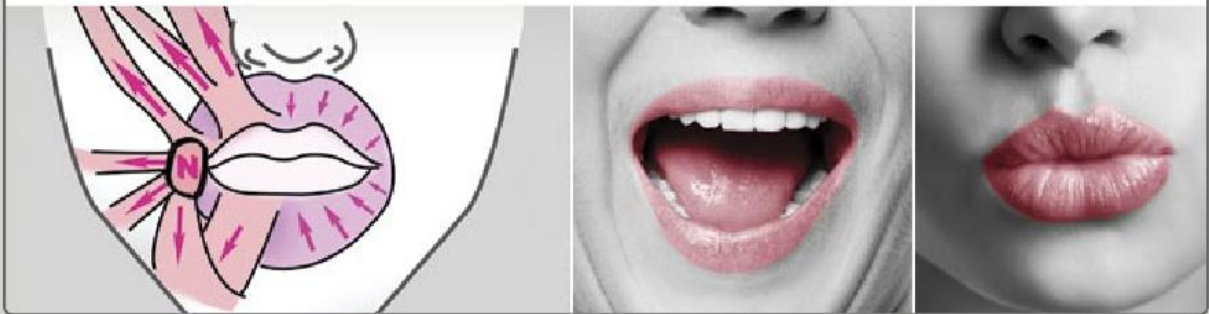
i



MOUTH

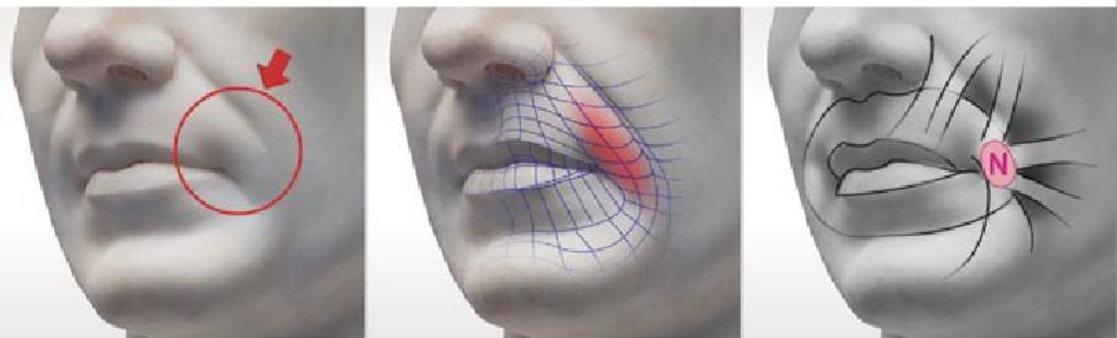
i

MOUTH EXPRESSIONS – IT'S ALL ABOUT PULLING AND SQUEEZING.



i

WHAT IS THIS BUMP?



IT IS CALLED THE **"NODE"**.

IT IS THE POINT WHERE SEVERAL FACIAL MUSCLES CONNECT TO THE CORNER OF THE MOUTH.



WHEN YOU SCULPT EXPRESSIONS, REMEMBER BONY LANDMARKS! BY PULLING IN DIFFERENT DIRECTIONS, THESE MUSCLES CREATE THE EXPRESSIONS, WHILE SKULL REMAINS THE SAME.



MOUTH EXPRESSIONS



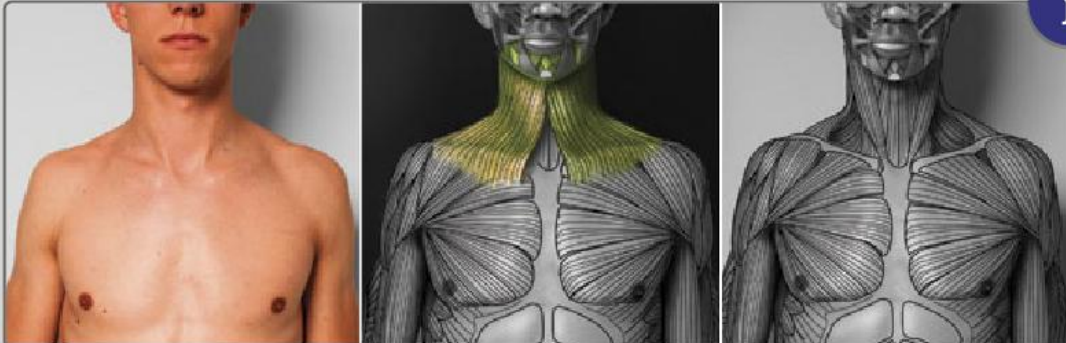
MORE MOUTH EXPRESSIONS



EVEN MORE MOUTH EXPRESSIONS



PLATYSMA MUSCLE



i

THE PLATYSMA IS A BROAD, THIN LAYER OF MUSCLE THAT IS SITUATED ON EACH SIDE OF THE NECK IMMEDIATELY UNDER THE SUPERFICIAL FASCIA.



i

THE PLATYSMA BELONGS TO THE GROUP OF FACIAL MUSCLES AND DRAWS THE CORNERS OF THE LOWER LIP AND MOUTH TO THE SIDES AND DOWNWARD. WHEN FLEXED FORCEFULLY, IT EXPANDS THE NECK AND DRAWS ITS SKIN UPWARD.



!

WEAKNESS OF THIS MUSCLE IS OFTEN THE MAJOR FACTOR IN CAUSING SAGGING UNDER THE CHIN IN OLDER PEOPLE (THIS IS NOT DUE TO AGING SKIN OR FROM FAT ACCUMULATION).

STERNOCLEIDOMASTOID MUSCLE IN ACTION

i



HEAD UP (BN) ABOVE (BE)

BOTTOM OF NOSE (BN)

BOTTOM OF EAR (BE)



HEAD STRAIGHT (BN) LINED UP WITH (BE)

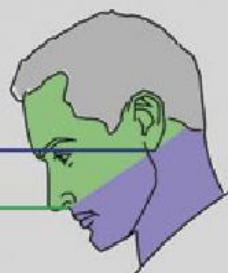
(BN) = (BE)



HEAD DOWN (BE) ABOVE (BN)

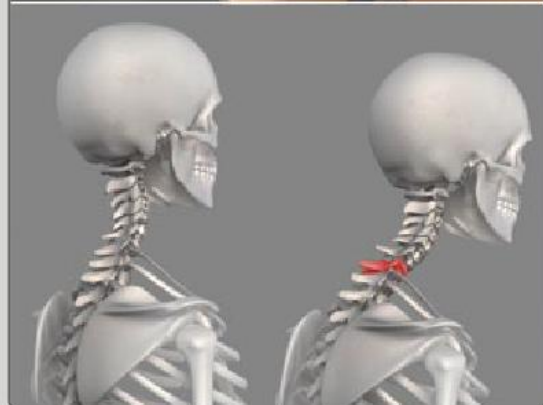
BOTTOM OF EAR (BE)

BOTTOM OF NOSE (BN)

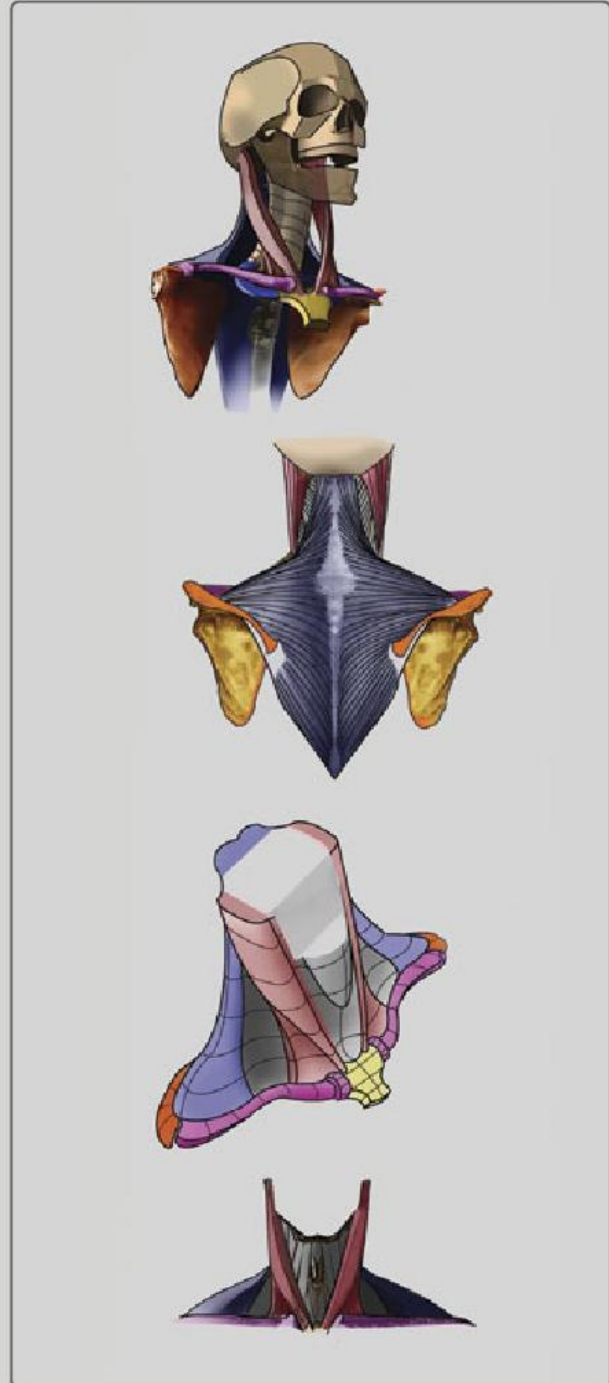
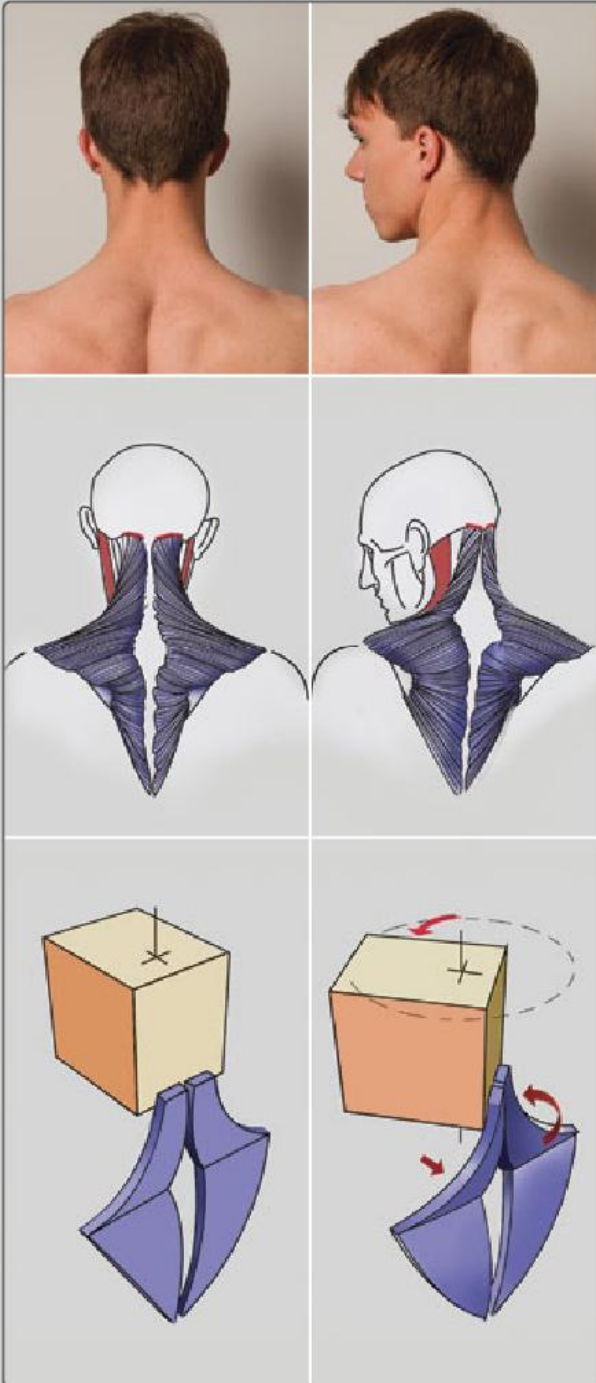


7TH CERVICAL VERTEBRAL BONE
(WHERE THE NECK MEETS THE SHOULDERS).

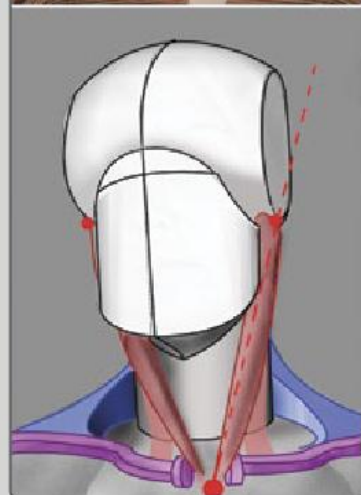
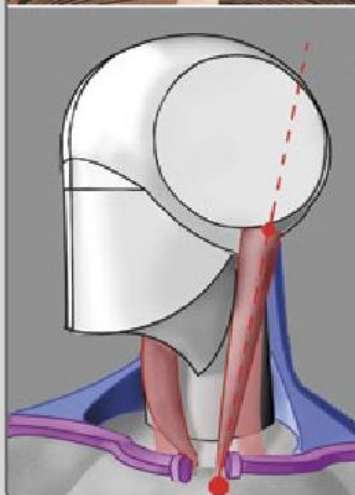
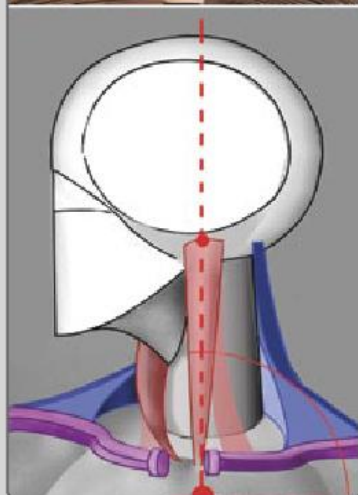
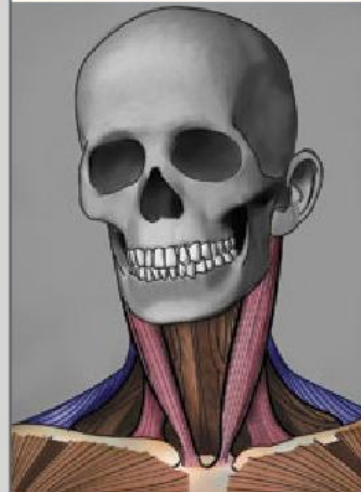
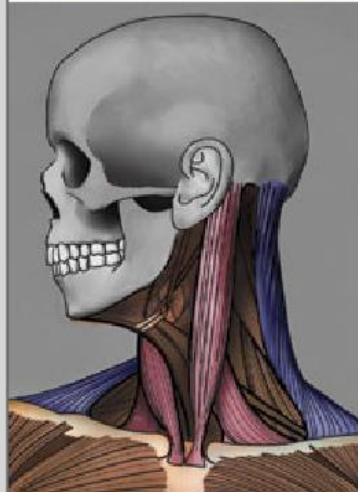
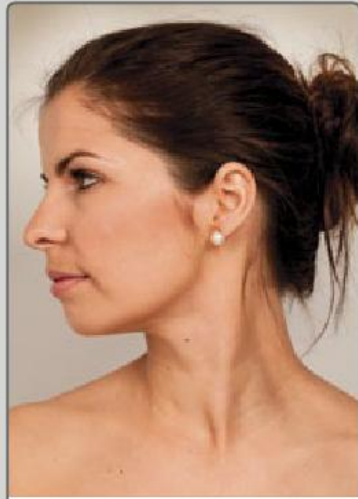
WHEN HEAD IS BENT FORWARD, YOU CAN SEE PROMINENT VERTEBRA AT THE TOP OF THE SPINE PROTRUDING OUTWARD SLIGHTLY.



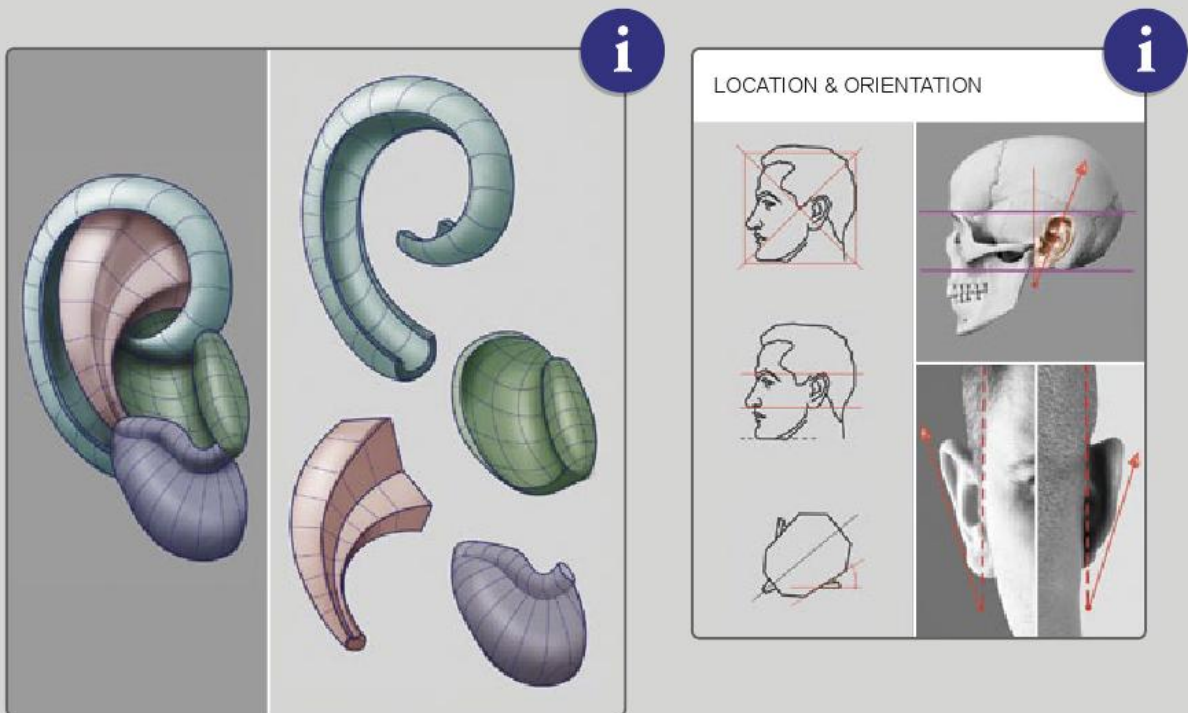
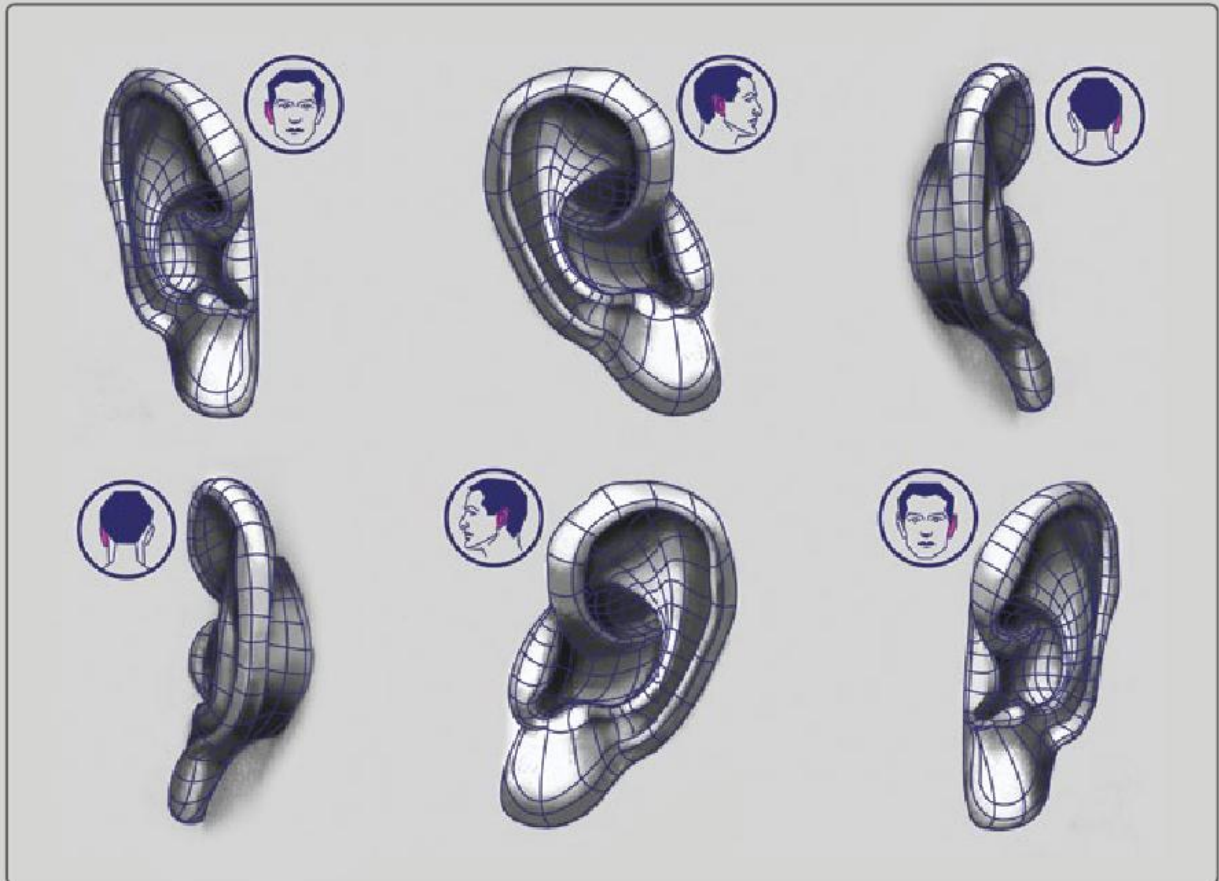
TRAPEZIUS MUSCLE, **STERNOCLEIDOMASTOID** MUSCLE



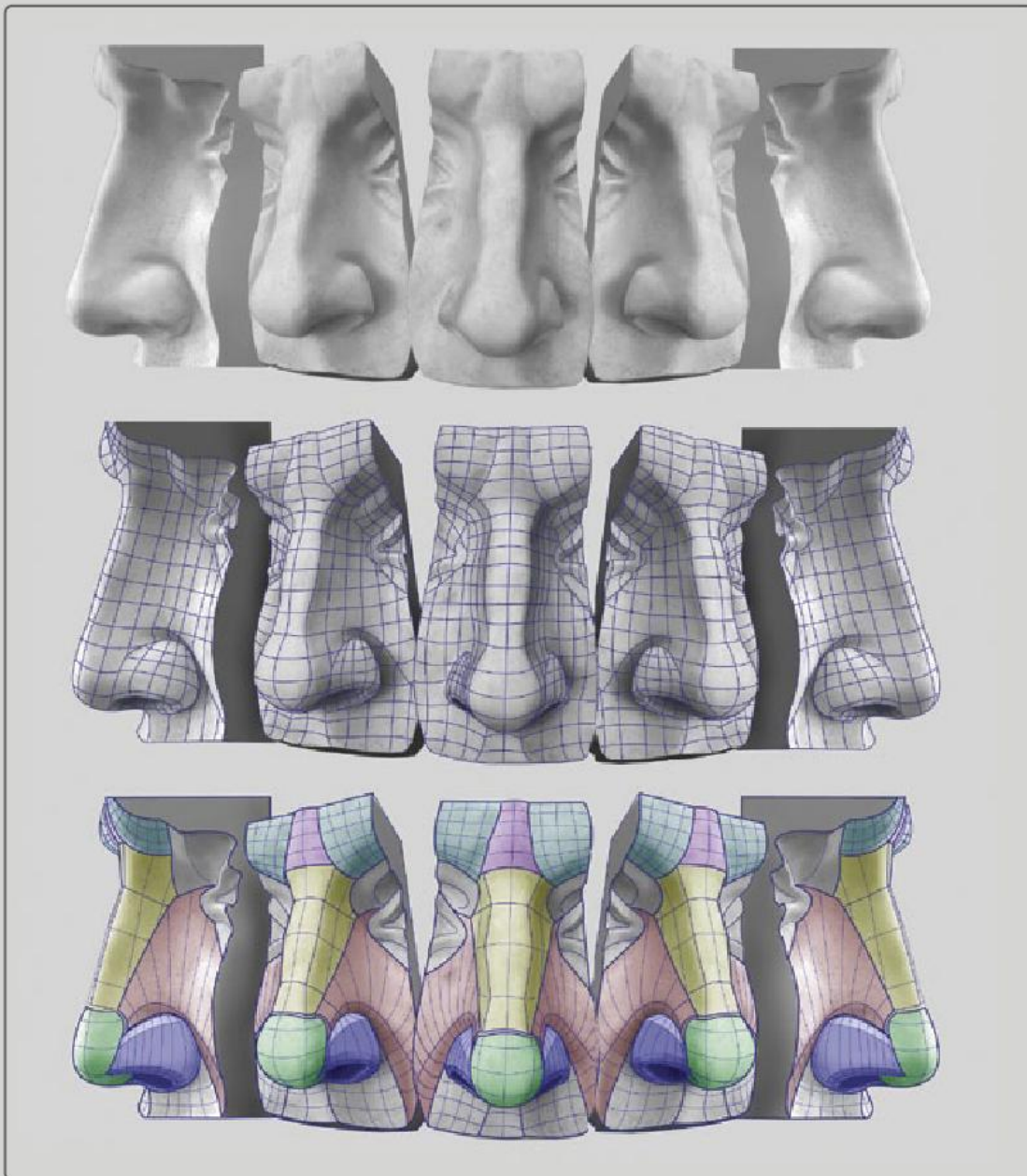
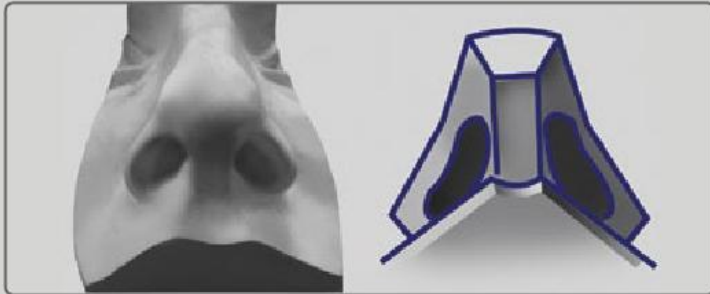
MAJOR NECK MUSCLES (**TRAPEZIUS** AND **STERNOCLEIDOMASTOID**)



EAR

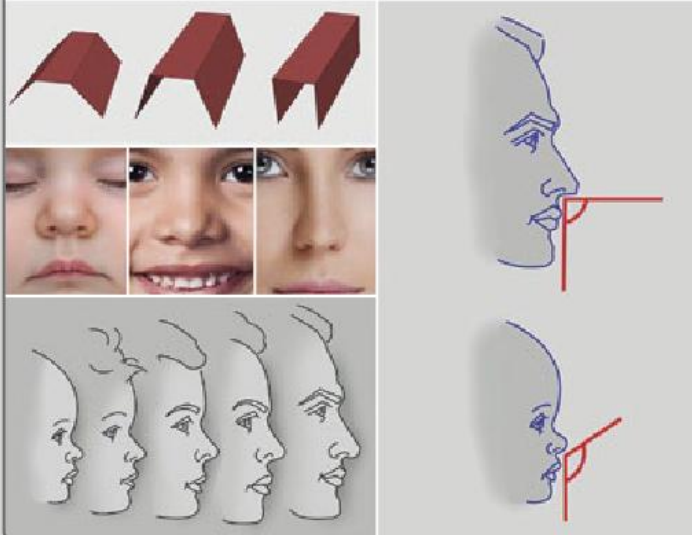


CLASSICAL NOSE

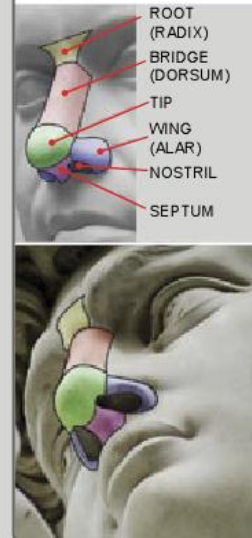


ALL ABOUT NOSES

NOSES CHANGE WITH AGE

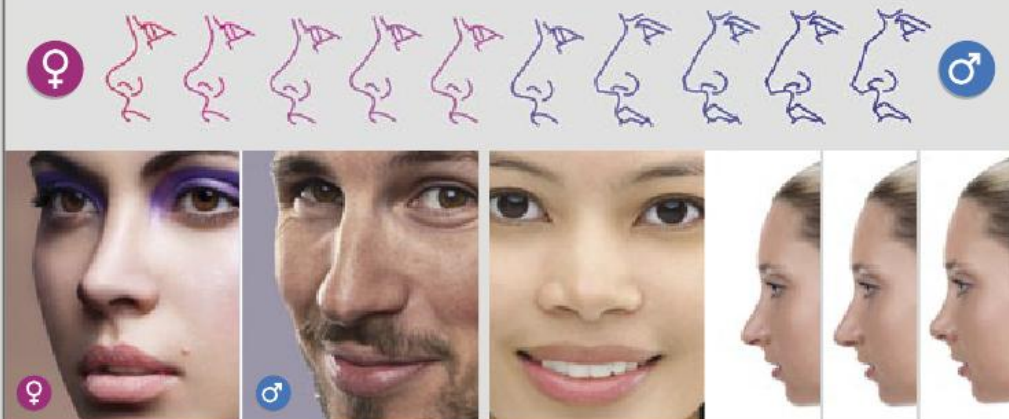


PARTS OF A NOSE



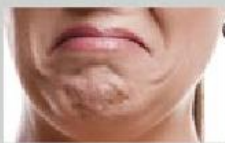
FEMALE VS. MALE NOSE

IDEALISTIC NOSE



TIPPING UP THE POINT OF THE NOSE WILL MAKE IT LOOK CHILD-LIKE. GIVING IT A CONCAVE OR THIN BRIDGE WILL MAKE IT LOOK MORE FEMININE!

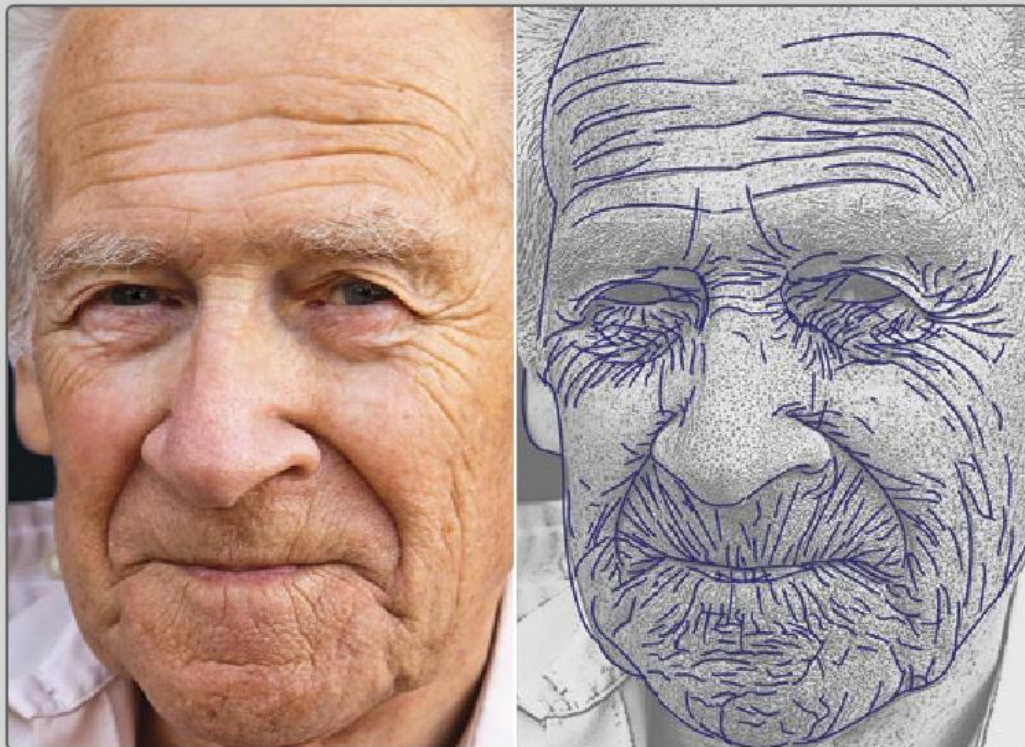
FUNCTIONS OF FACIAL MUSCLES



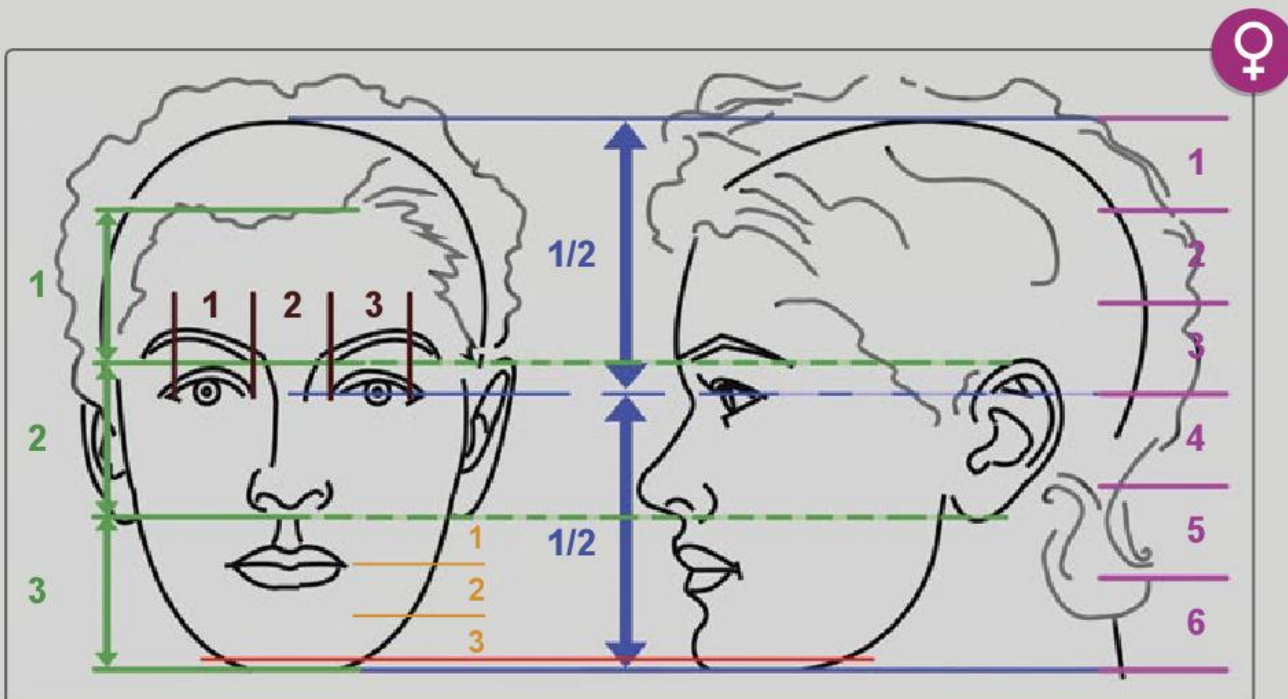
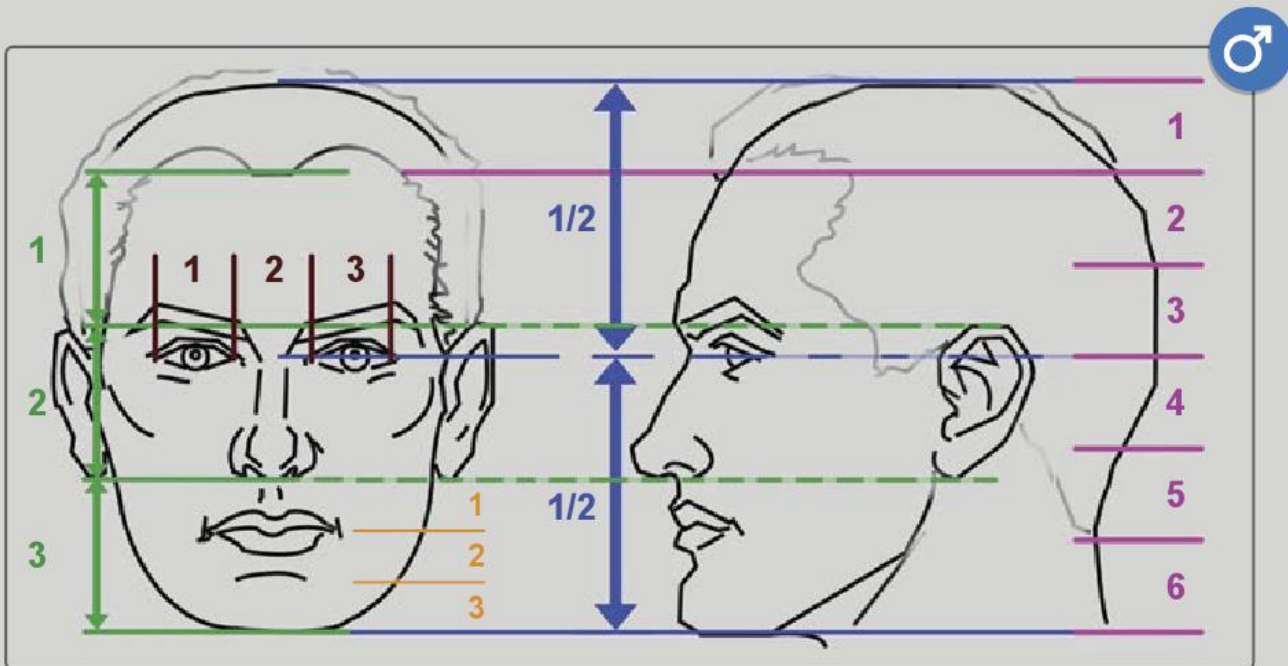
DYNAMIC WRINKLES



AGING WRINKLES

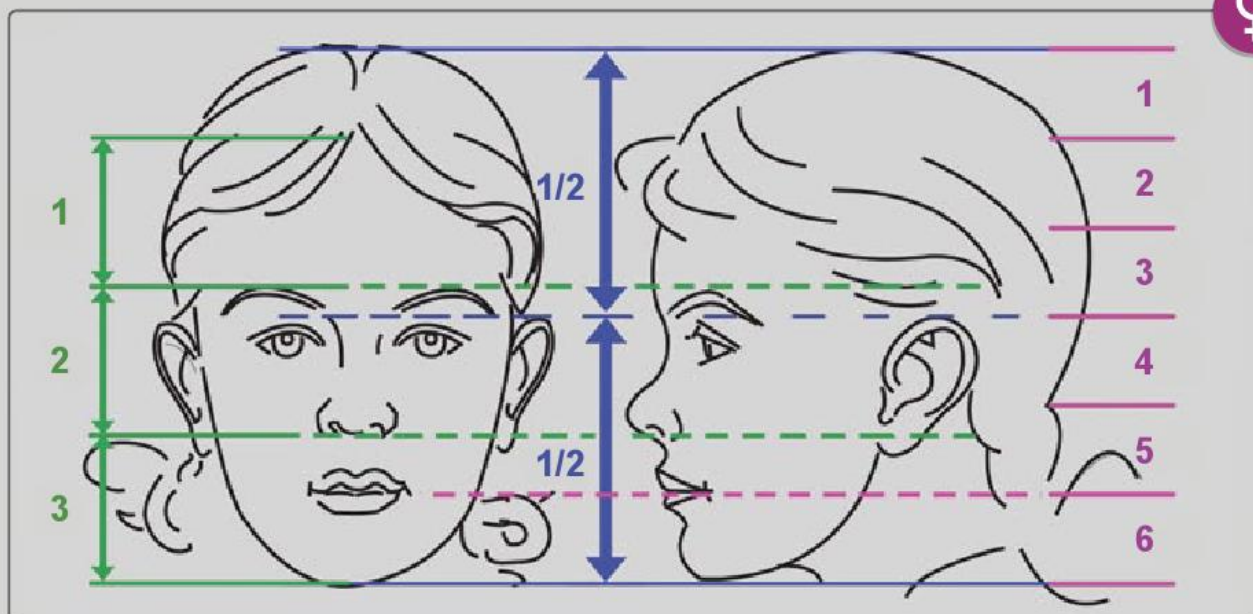
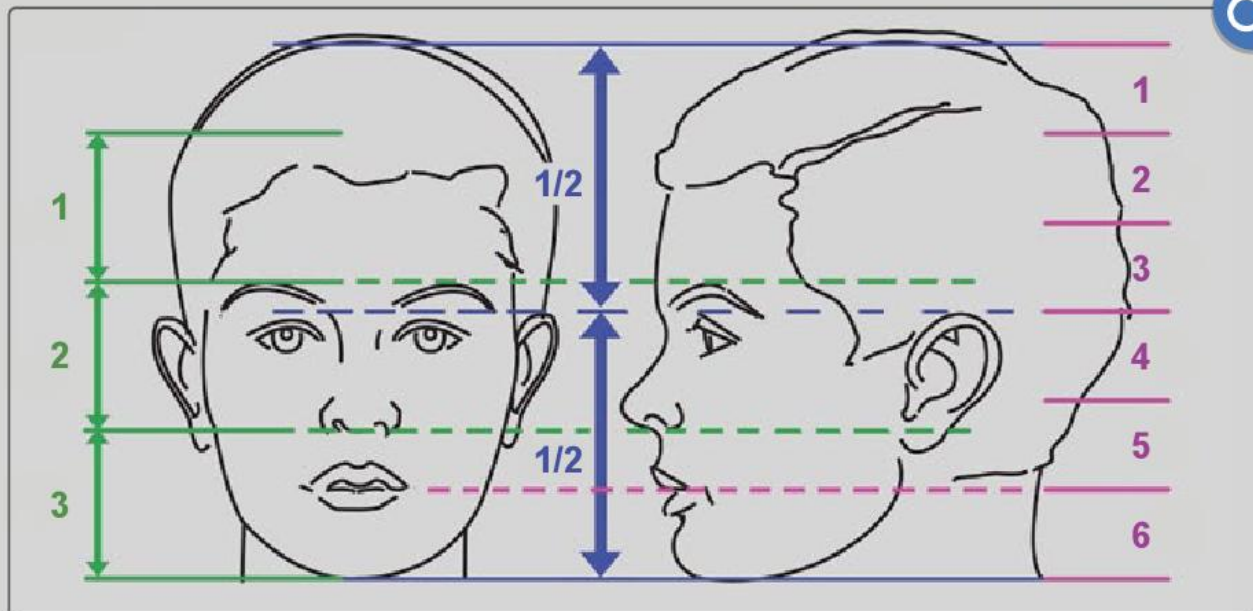


IDEALIZED PROPORTIONS OF ADULT HEADS

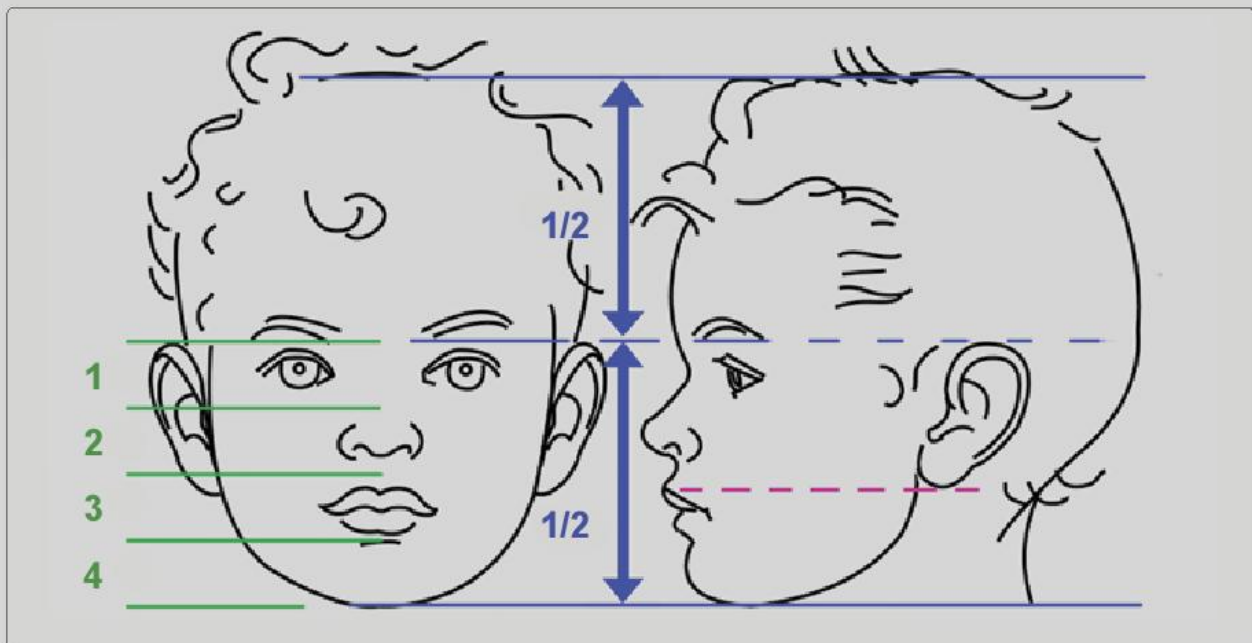
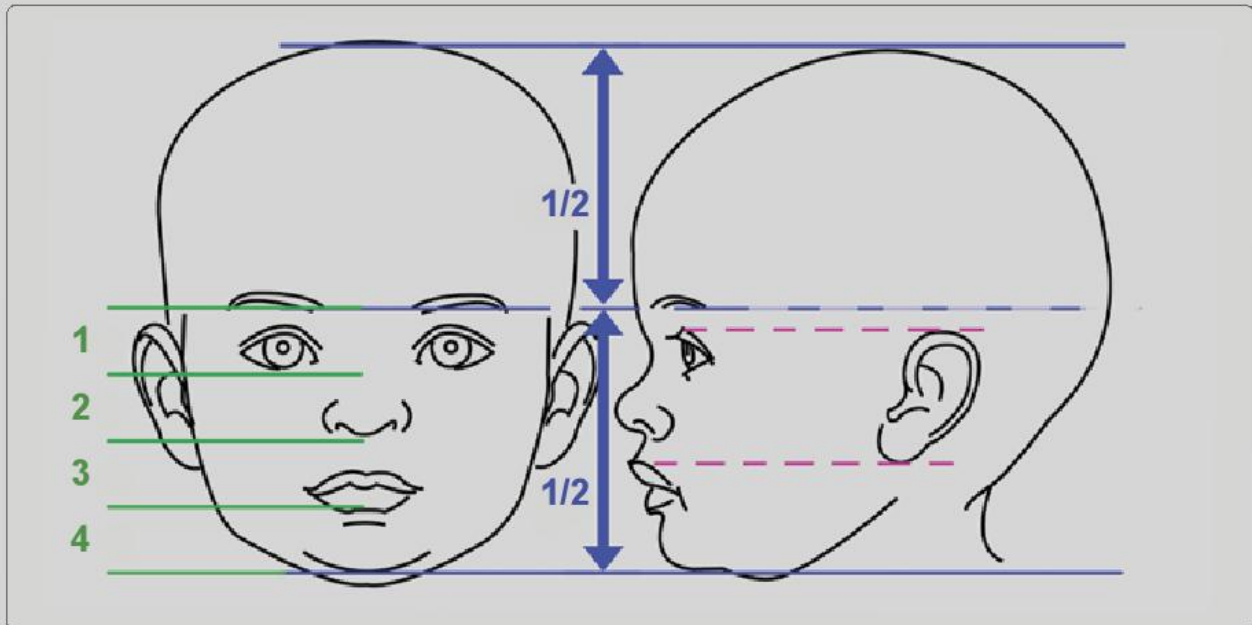


FEMALES HAVE A SLIGHTLY THINNER CHIN AND JAW.

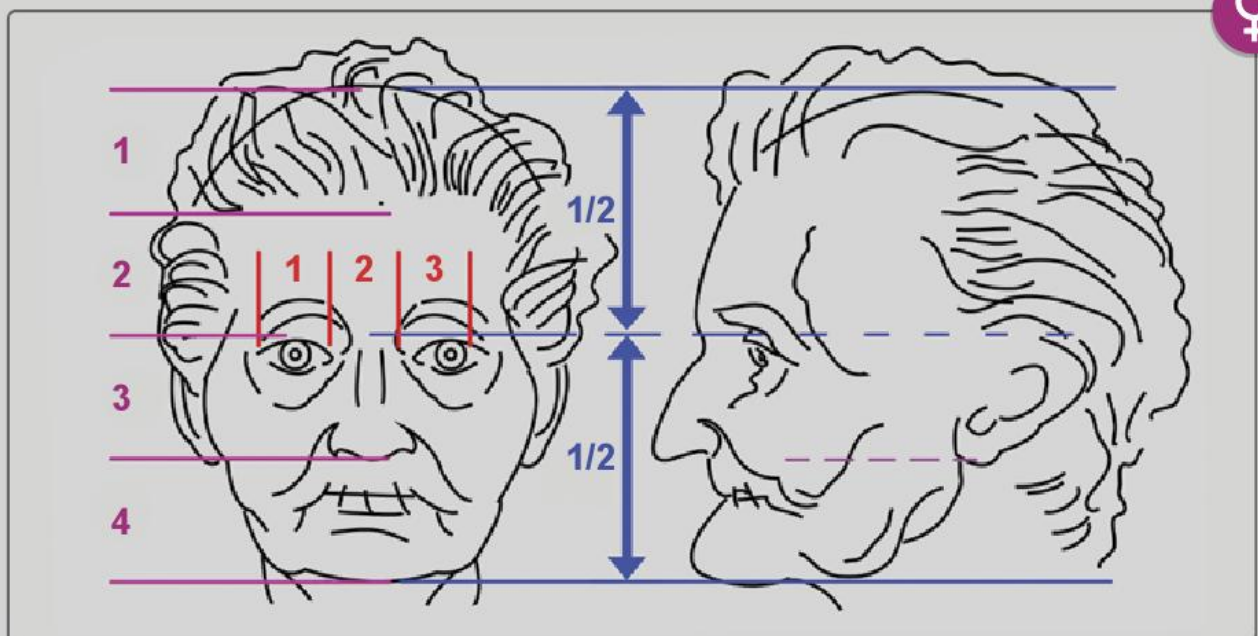
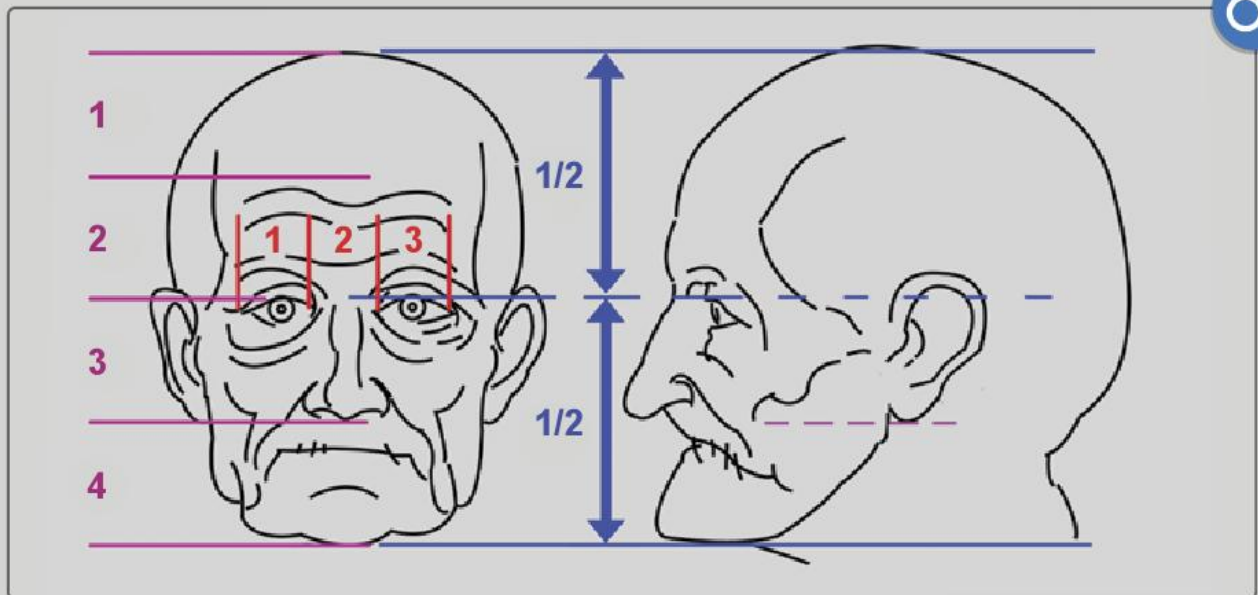
PROPORTIONS OF CHILDREN'S HEADS



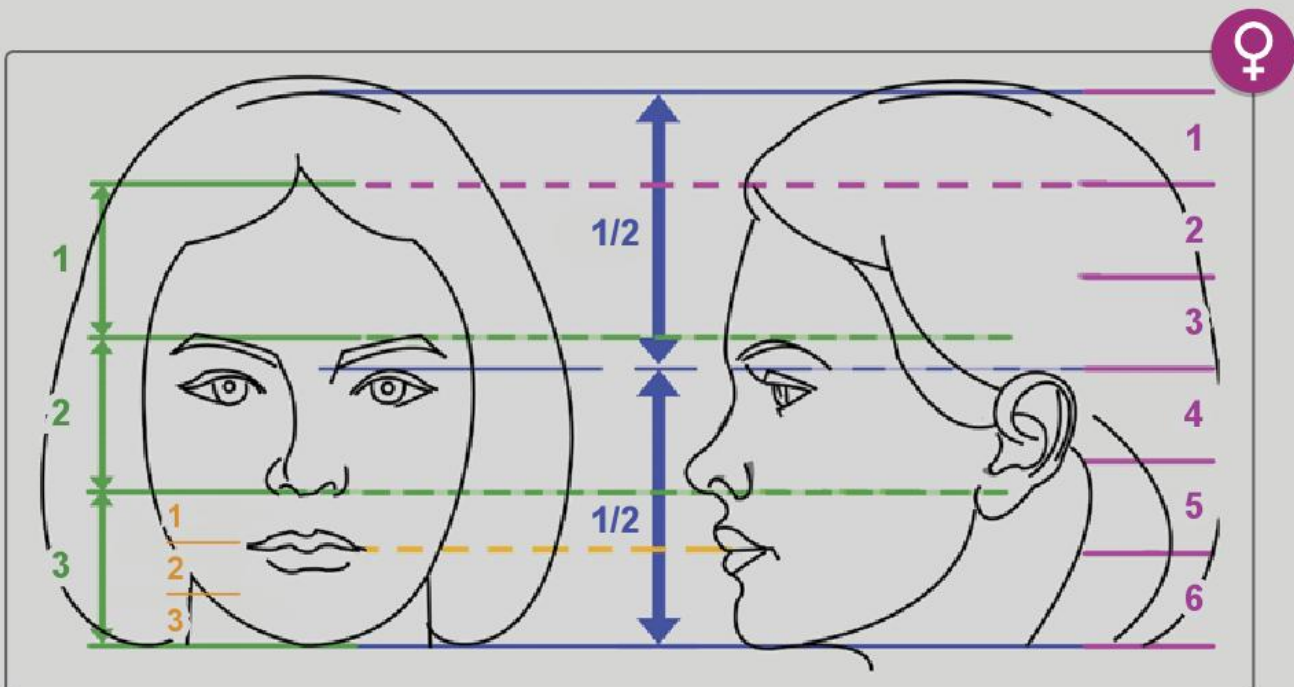
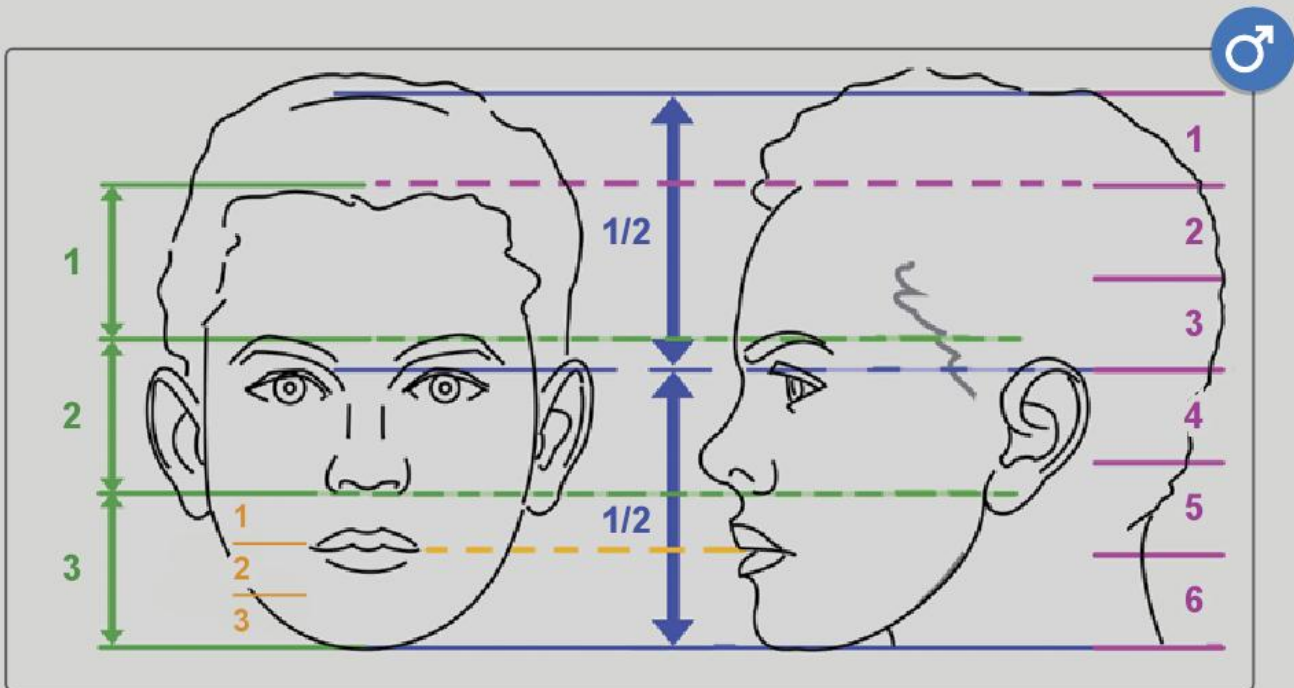
PROPORTIONS OF BABY AND TODDLER HEADS



PROPORTIONS OF ELDERLY HEADS



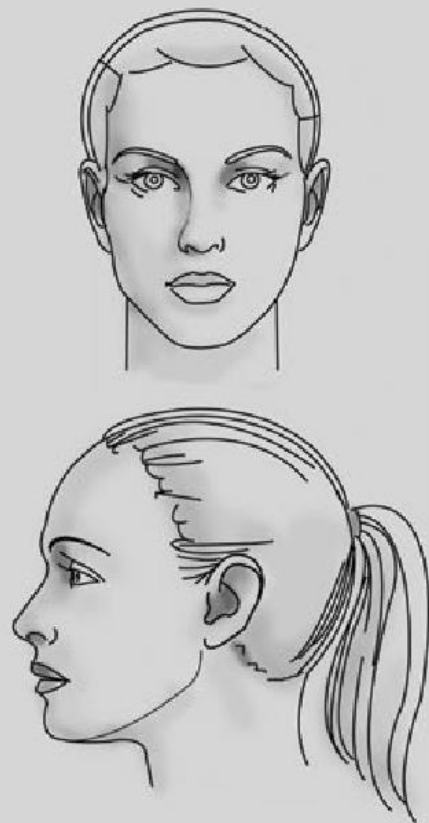
PROPORTIONS OF TEEN HEADS



GENDER DIFFERENCES BETWEEN IDEALIZED ADULT HEADS



- DISTINCT PROTRUDING **BROW RIDGES**
- **NOSE ROOT** IS USUALLY EXPRESSED CLEARLY AND CAN BE QUITE DEEP
- **PLANE OF FOREHEAD** HAS A SMALL SLOPE TOWARDS THE REAR, CONTOUR OF FOREHEAD IS NOT STRAIGHT BUT SOMEWHAT WAVY
- **CHEEKBONES** EXPRESSED CLEARLY
- BUSHY **EYEBROWS** STAND OUT, AS A RULE ARE LESS ARCHED SHAPE AND SIT LOWER OVER EYES
- **UPPER EYELID** IS NOT PARTICULARLY DISTINGUISHED AND IS LOCATED CLOSE TO EDGE OF THE INFRAORBITAL FORAMEN
- LONGER **NOSE** COMPARED TO A FEMALE
- UNDERLYING **THE NOSE** IS A CLEARLY VISIBLE BONE-SKELETAL STRUCTURE, IT IS USUALLY LARGE. FORM IS ALMOST STRAIGHT OR SLIGHTLY CONVEX.
- **NOSE** IS THICK AND BROAD
- BASE OF **NOSE** LIES ON A HORIZONTAL PLANE
- TIP OF **NOSE** IS LARGE AND ROUNDED
- FOLD CONTOUR OF **UPPER LIP** IS SLIGHTLY CONVEX
- CAUCASIAN MALE **LIPS** ARE NOT AS FULL AND PUFFY AS A FEMALE'S
- PROTRUDING **CHEEKBONES**
- **CHIN** IS MASSIVE, CLEARLY DEFINED, OFTEN DIMPLED
- **LOWER JAW'S** WIDEST CORNERS ARE MARKED CLEARLY AND SOMEWHAT SHIFTED Laterally (DUE TO DEVELOPED CHEWING MUSCLES)



- CLEARLY EXPRESSED **EYEBROWS**
- SMALLER **NOSE ANGLE**
- MORE VERTICAL, PROMINENT AND ROUNDER **PLANE OF FOREHEAD**
- PROTRUDING **CHEEKBONES**
- THIN **EYEBROWS** WITH AN ARCHED FORM, USUALLY MUCH HIGHER THAN THE EYES OF MALES
- LARGER **UPPER EYELID**
- DEEPENING OF **ROOT OF THE NOSE** IS ALMOST UNNOTICEABLE
- STRUCTURE OF **NOSE** IS THIN AND USUALLY STRAIGHT OR SLIGHTLY CONCAVE
- **NOSE**, THIN WELL-DEFINED
- BASE OF **NOSE** ON PLANE, TILTED SOMEWHAT UPWARD
- TIP OF **THE NOSE** CLEARLY EXPRESSED (DUE TO CARTILAGE STRUCTURE)
- UPPER LIP OFTEN HAS A SLIGHT INDENTATION CENTERED UNDER THE NOSE CALLED THE PHILTRUM
- **LIPS** ARE SMALL, OFTEN FULL AND POUTY
- **CHEEKS** ARE SMOOTH, AND SOMETIMES PUBESCENT, FLAT OR SLIGHTLY CONVEX
- A SMALL **CHIN** WITH A ROUND SHAPE
- **LOWER JAW** IS MARKEDLY DEFINED, WITH A ROUNDED ANGLE
- IN RELATION TO THE SIZE OF HEAD AND SHOULDERS, WOMEN HAVE A LONG, SLENDER **NECK**

EMOTION – EXCITEMENT



EMOTION – HAPPINESS



EMOTION – ANGER



EMOTION – SURPRISE



EMOTION – DISGUST



EMOTION – FEAR



EMOTION – INTEREST



EMOTION – WORRY



ETHNICITIES



BABY EMOTIONS



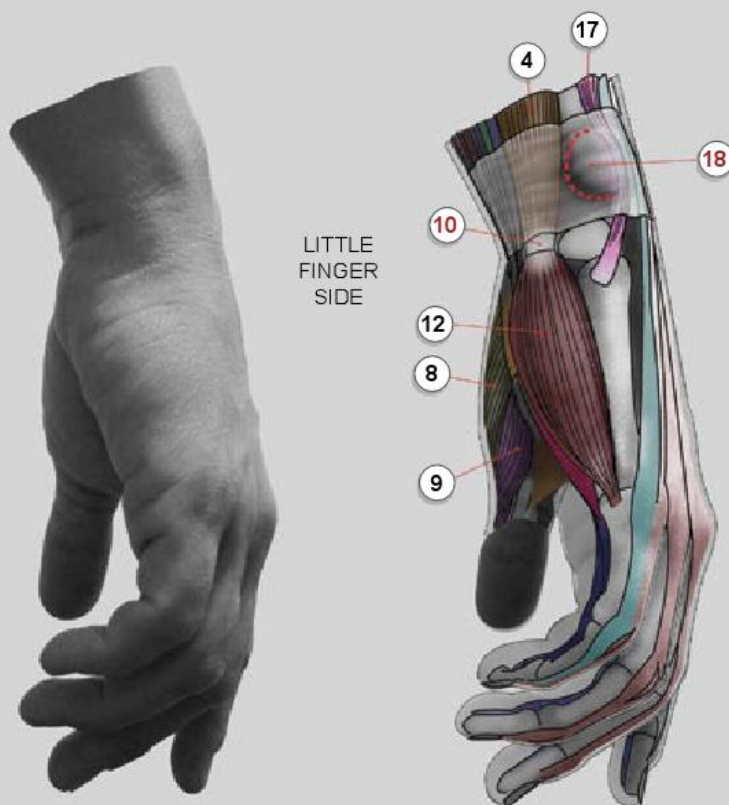
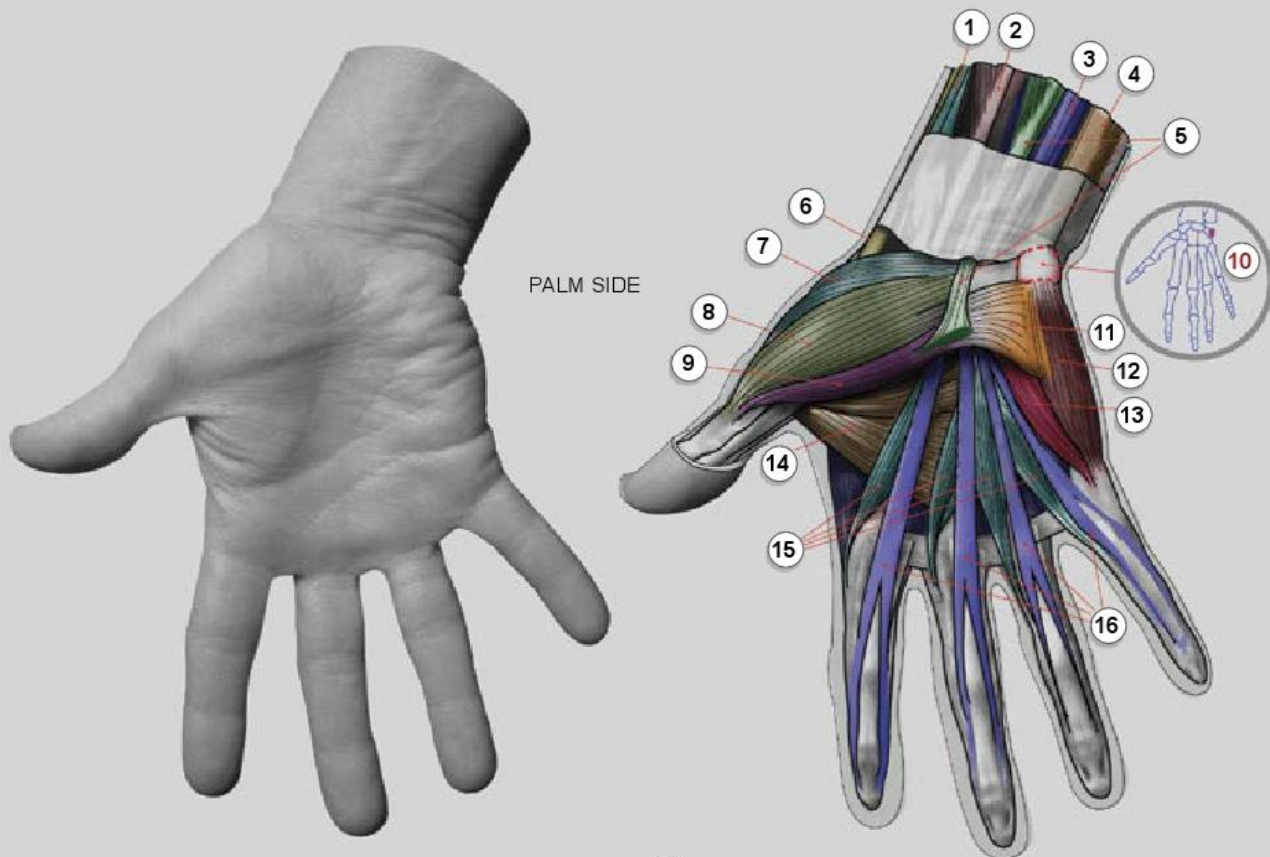
SENIOR EMOTIONS





HAND AND WRIST MUSCLES

i



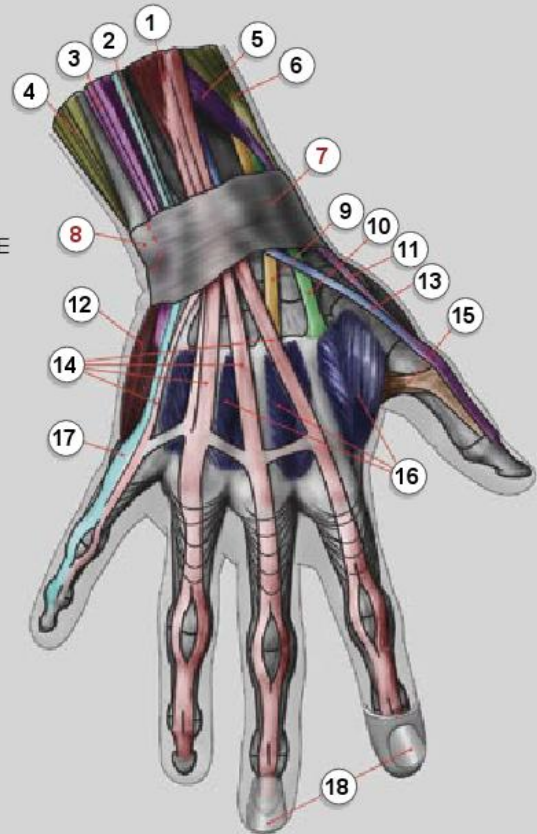
- 1 BRACHIORADIALIS
- 2 FLEXOR CARPI RADIALIS
- 3 f.d.s.*
- 4 FLEXOR CARPI ULNARIS
- 5 PALMARIS LONGUS
- 6 ABDUCTOR POLLICIS LONGUS
- 7 OPPONENS POLLICIS
- 8 ABDUCTOR POLLICIS BREVIS
- 9 FLEXOR POLLICIS BREVIS
- 10 **PISIFORM BONE**
- 11 PALMARIS BREVIS
- 12 ABDUCTOR DIGITI MINIMI
- 13 FLEXOR DIGITI MINIMI BREVIS
- 14 ADDUCTOR POLLICIS
- 15 LUMBRICALS
- 16 TENDONS OF f.d.s.*
- 17 EXTENSOR CARPI ULNARIS
- 18 **THE HEAD OF THE ULNA**

flexor digitorum superficialis *

HAND AND WRIST MUSCLES



DORSAL SIDE



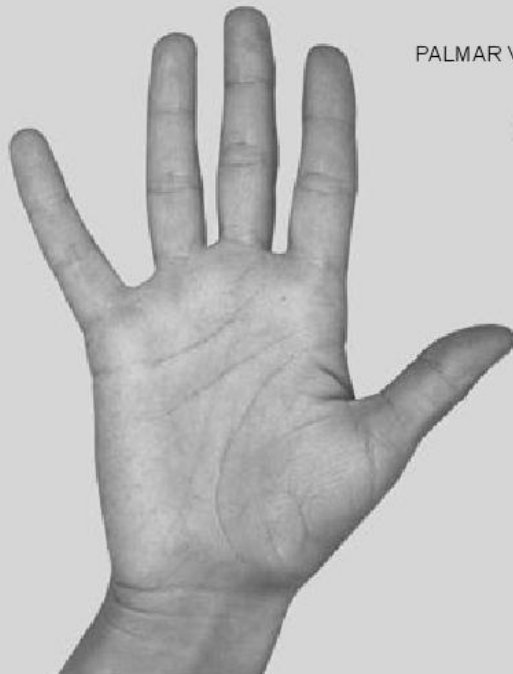
THUMB SIDE



- 1 EXTENSOR DIGITORUM
- 2 EXTENSOR DIGITI MINIMI
- 3 EXTENSOR CARPI ULNARIS
- 4 FLEXOR CARPI ULNARIS
- 5 EXTENSOR POLLICIS BREVIS
- 6 ABDUCTOR POLLICIS LONGUS
- 7 EXTENSOR RETINACULUM
- 8 THE HEAD OF THE ULNA BONE
- 9 TENDON OF e.c.r.b.*
- 10 TENDON OF e.c.r.l.**
- 11 TENDON OF e.p.b.***
- 12 ABDUCTOR DIGITI MINIMI
- 13 TENDON OF e.p.l.****
- 14 TENDONS OF e.d.*****
- 15 ADDUCTOR POLLICIS
- 16 DORSAL INTEROSSEI MUSCLES
- 17 EXTENSOR OF e.d.m.*****
- 18 NAIL

extensor carpi radialis brevis *
extensor carpi radialis longus **
extensor pollicis brevis ***
extensor pollicis longus ****
extensor digitorum *****
extensor digiti minimi *****

HAND AND WRIST BONES



PALMAR VIEW

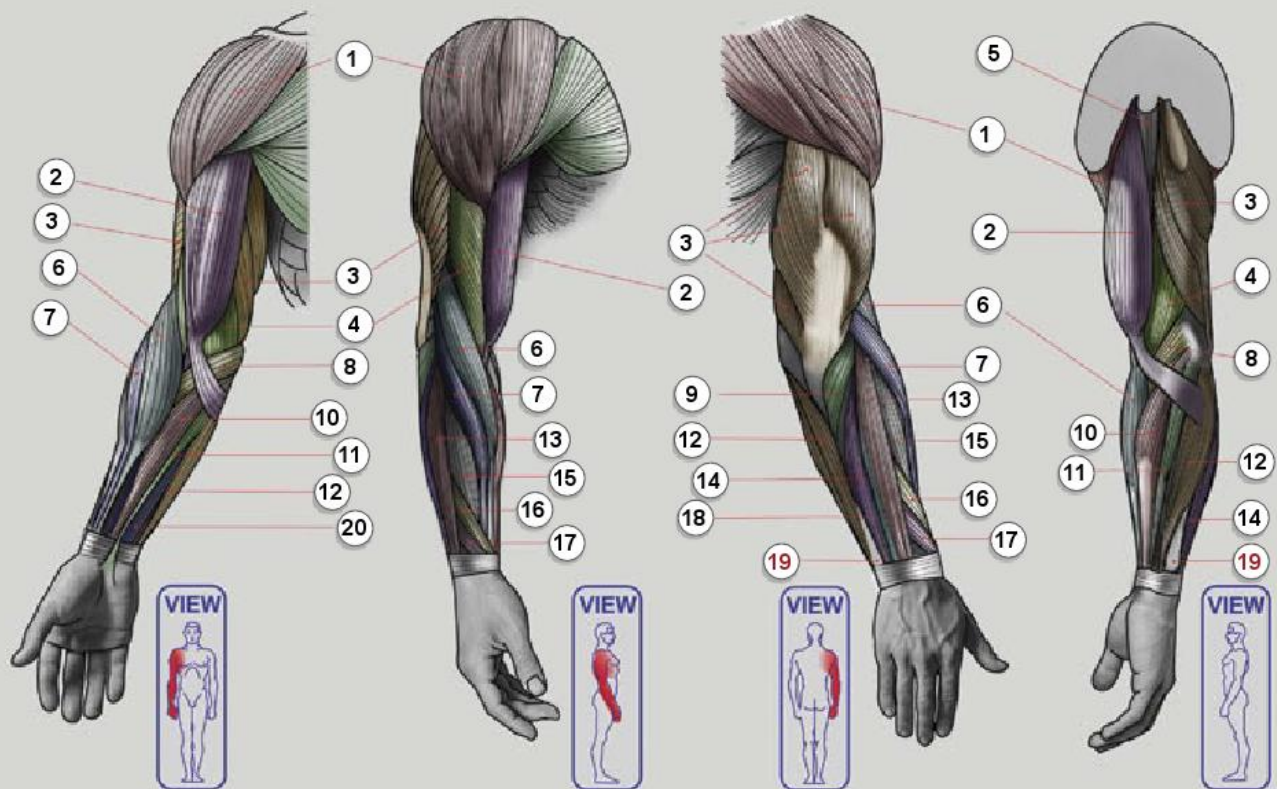


DORSAL VIEW



- | | | | |
|----------------------|---------------|------------|--------------|
| 1 DISTAL PHALANGES | 4 METACARPALS | 7 PISIFORM | 10 TRAPEZOID |
| 2 MIDDLE PHALANGES | 5 HAMATE | 8 LUNATE | 11 TRAPEZIUM |
| 3 PROXIMAL PHALANGES | 6 TRIQUETRUM | 9 CAPITATE | 12 SCAPHOID |

MAJOR MUSCLES OF UPPER LIMB



1	SHOULDER MUSCLE (deltoid)	11	PALMARIS LONGUS
2	BICEPS BRACHII	12	FLEXOR CARPI ULNARIS
3	TRICEPS BRACHII	13	EXTENSOR DIGITORUM
4	BRACHIALIS	14	EXTENSOR CARPI ULNARIS
5	CORACOBRACHIALIS	15	EXTENSOR CARPI RADIALIS BREVIS
6	BRACHIORADIALIS	16	ABDUCTOR POLLICIS LONGUS
7	EXTENSOR CARPI RADIALIS LONGUS	17	EXTENSOR POLLICIS BREVIS
8	PRONATOR TERES	18	EXTENSOR DIGITI MINIMI
9	ANCONEUS	19	THE HEAD OF ULNA BONE
10	FLEXOR CARPI RADIALIS	20	FLEXOR DIGITORUM SUPERFICIALIS

SUPINATION AND PRONATION

i

IN THE POSITION OF THE ARM CALLED **SUPINATION**, THE **RADIUS** AND **ULNA** ARE PARALLEL, THE PALM OF THE HAND FACES FORWARD OR UPWARD, AND THE THUMB IS AWAY FROM THE BODY. IN THE POSITION CALLED **PRONATION**, THE **RADIUS** AND **ULNA** ARE CROSSED, THE PALM FACES TO THE REAR OR DOWNWARD, AND THE THUMB IS TOWARD THE BODY.

SUPINATION – LIKE YOU'RE A WATER CARRYING SOUP.

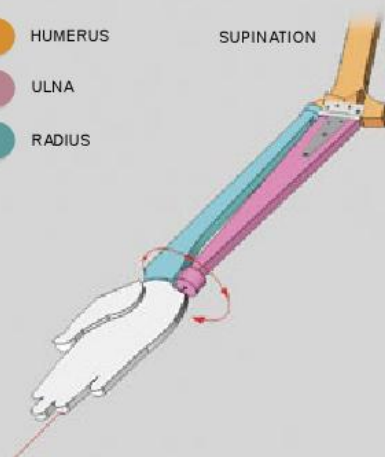


PRONATION – LIKE YOU'RE A PRO BASKETBALL PLAYER.

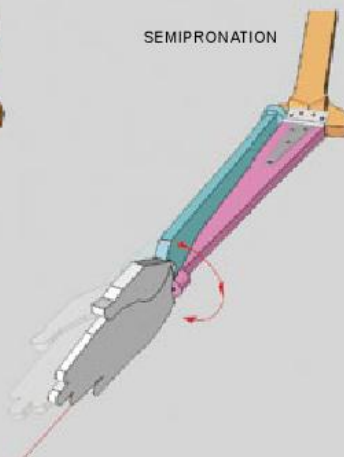


NOTE THAT PRONATION OF THE FOREARM DOES NOT INVOLVE ROTATION OF THE UPPER-ARM FROM THE SHOULDER JOINT!

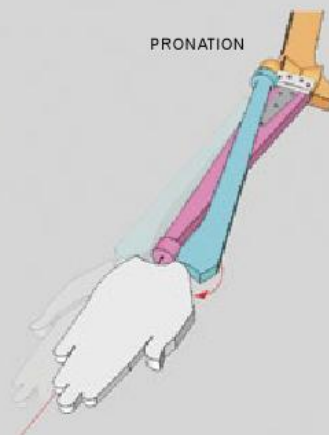
- HUMERUS
- ULNA
- RADIUS



SUPINATION



SEMI PRONATION

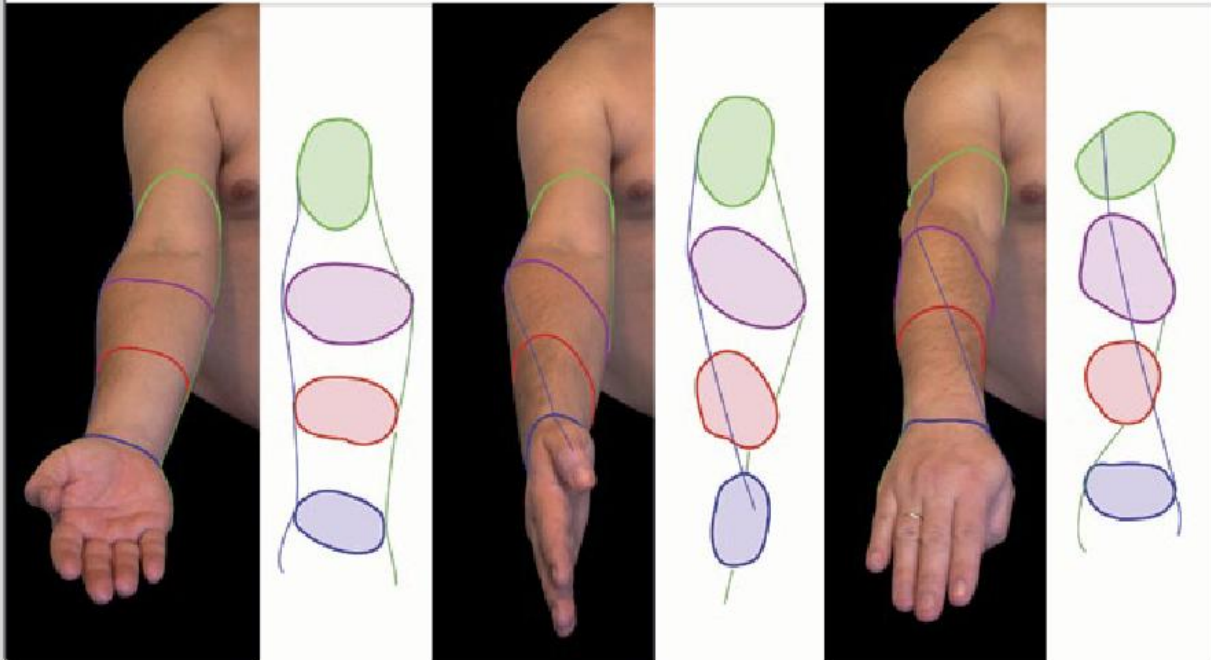


PRONATION

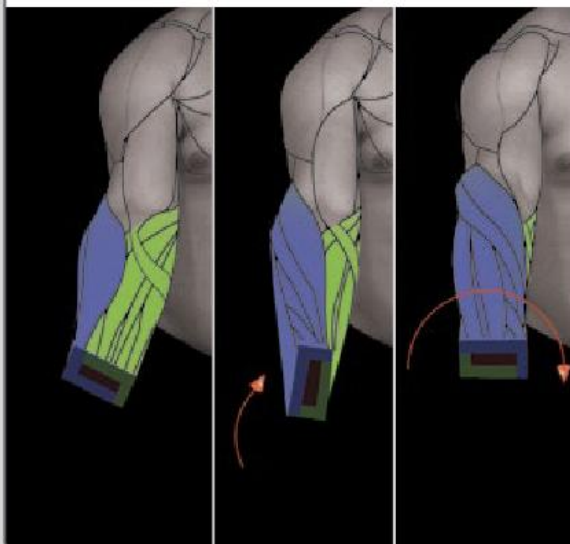
DURING **PRONATION**, **RADIUS** ROLLS AROUND THE **ULNA**

PRONATION AND FORM CHANGES

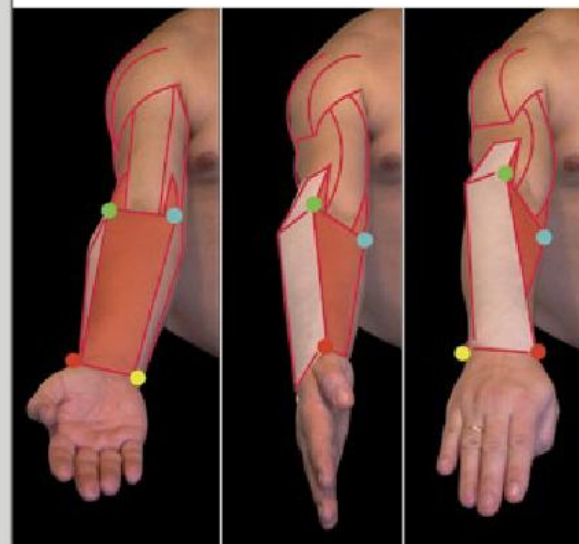
CROSS SECTIONS OF ARM DURING PRONATION



FLEXORS AND EXTENSORS



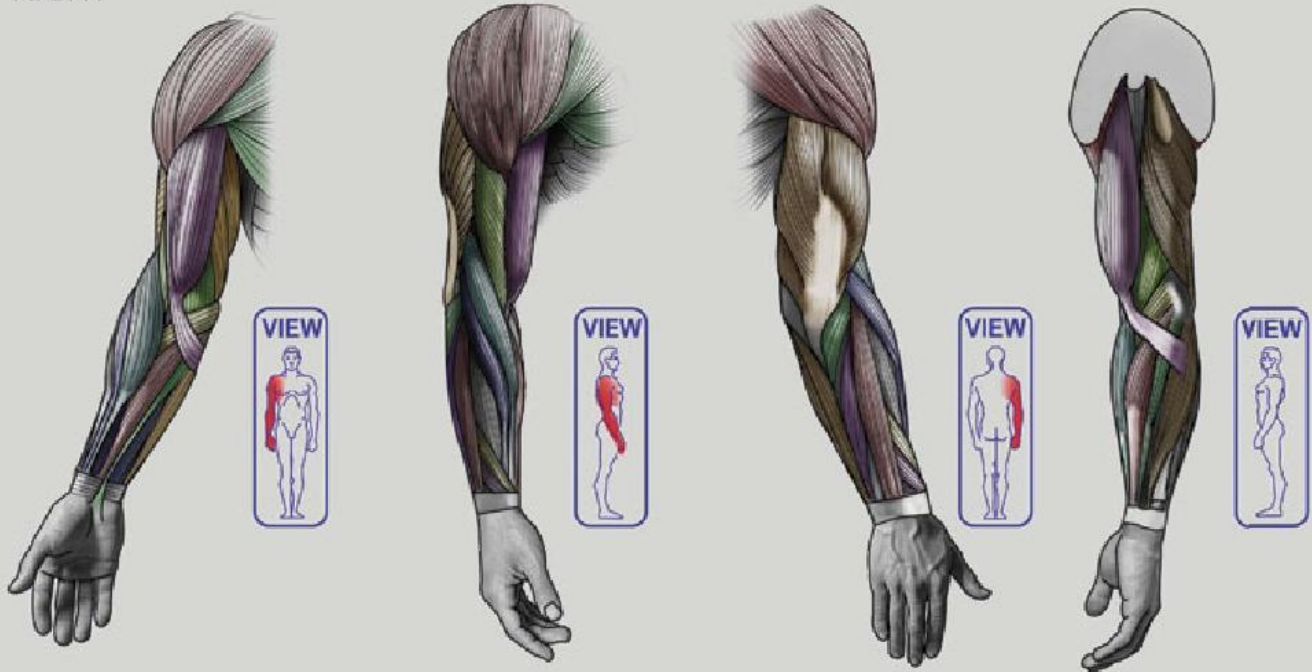
THIS IS AN EXAMPLE OF HOW IMPORTANT IT IS TO KNOW THE ORIGIN AND INSERTION POINTS OF MUSCLES.



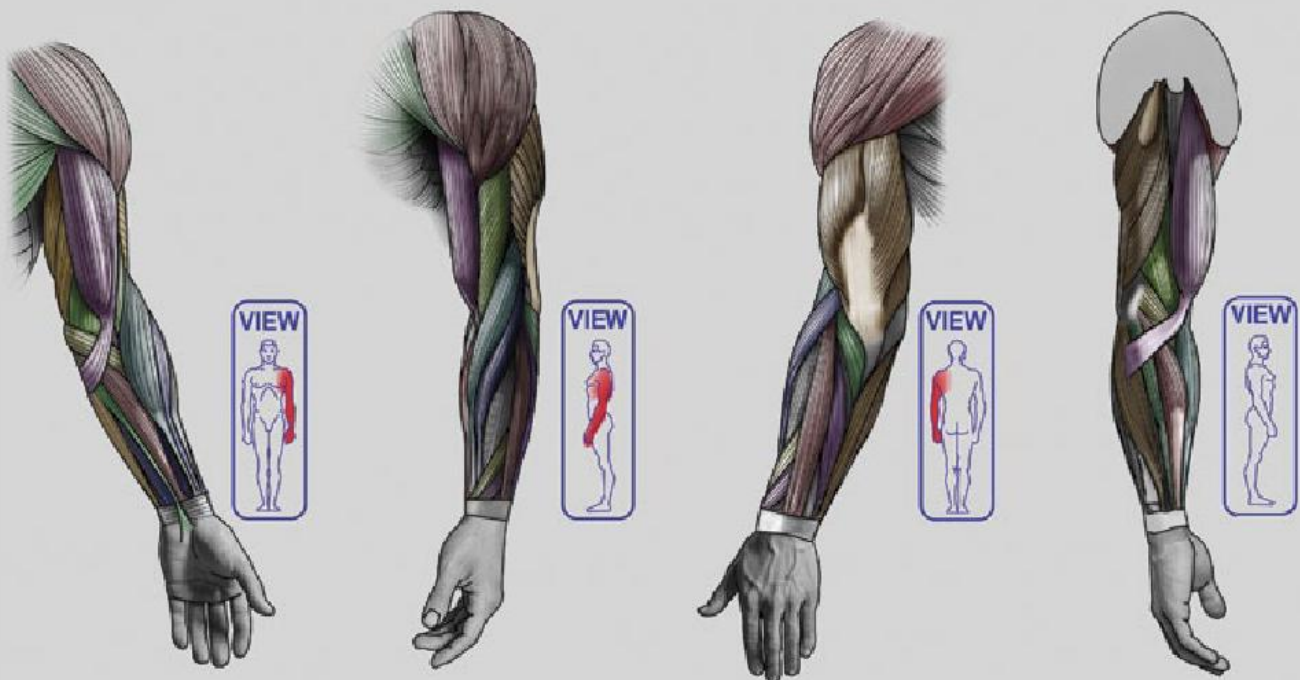
SUPINATED UPPER LIMB

(WHEN THE FOREARM OR PALM FACES TOWARD THE FRONT)

RIGHT



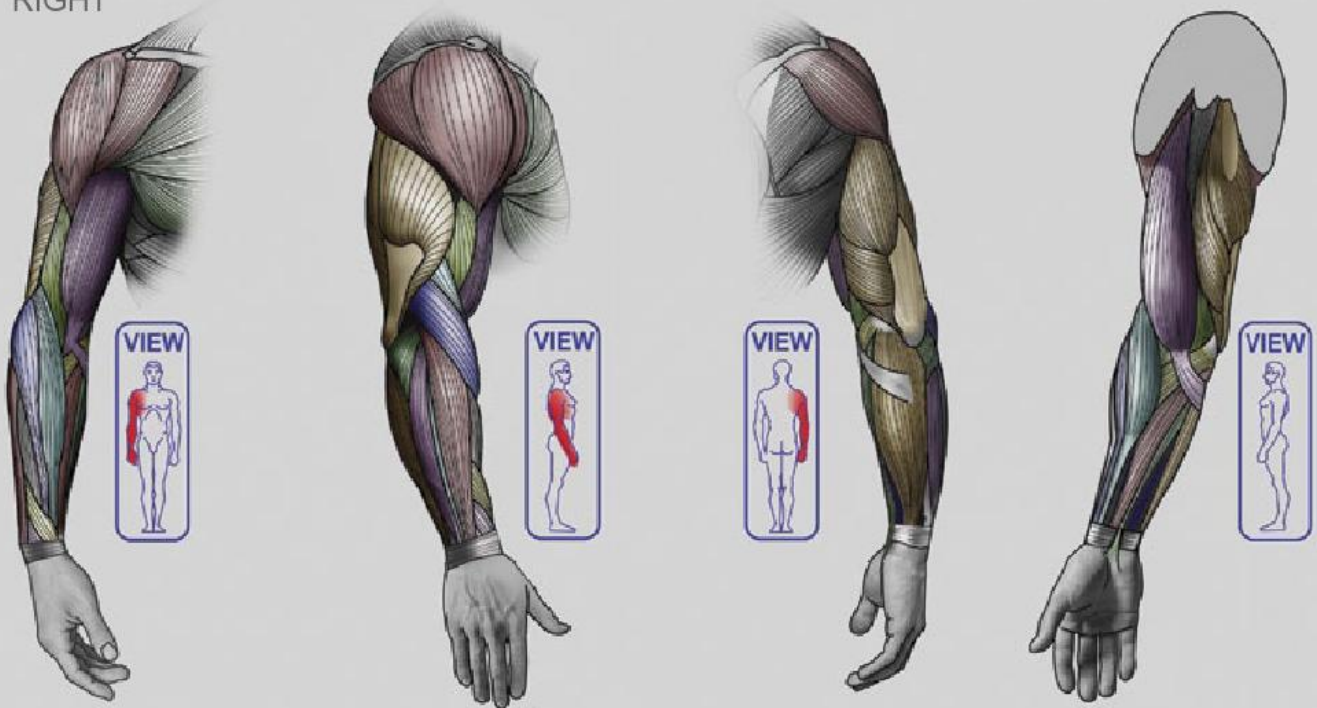
LEFT



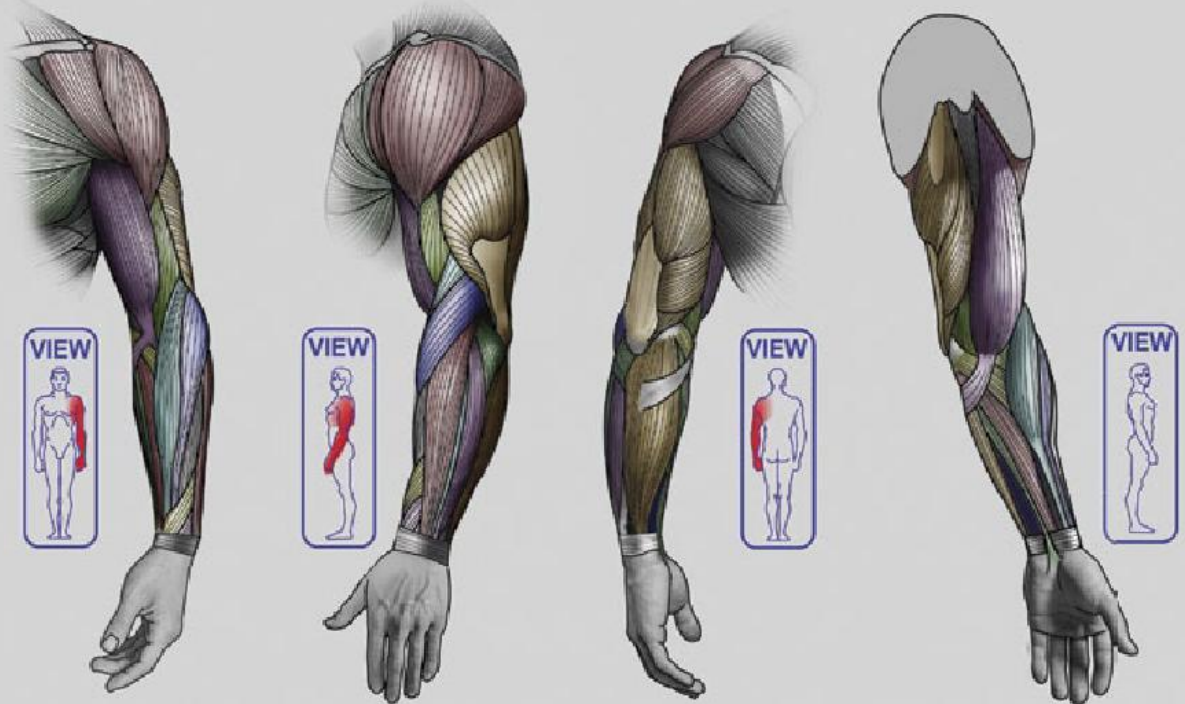
SEMI-PRONATED UPPER LIMB

(WHEN THE FOREARM OR PALM FACES TOWARD THE TRUNK)

RIGHT



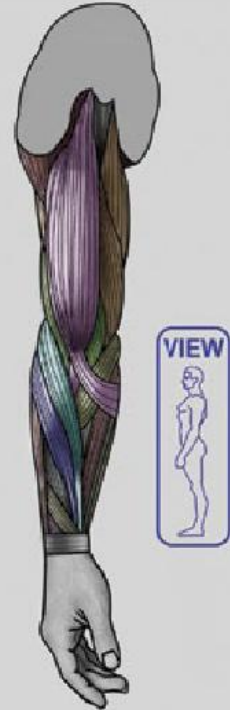
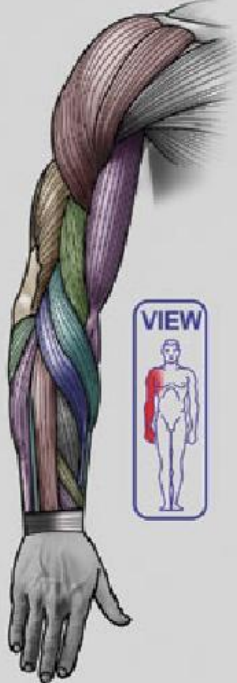
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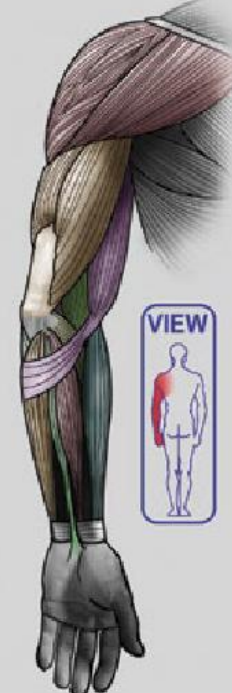
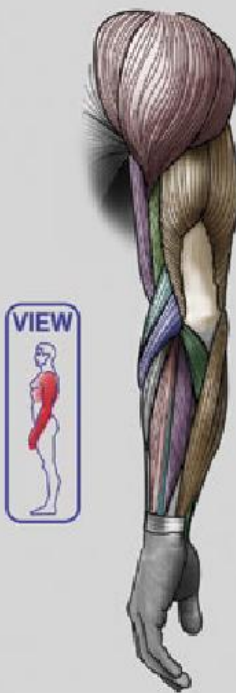
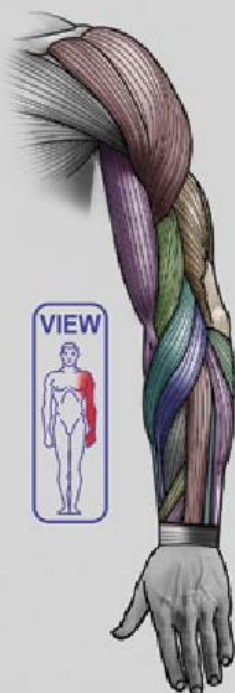
PRONATED UPPER LIMB

(WHEN FOREARM OR PALM FACES TOWARD THE BACK)

RIGHT



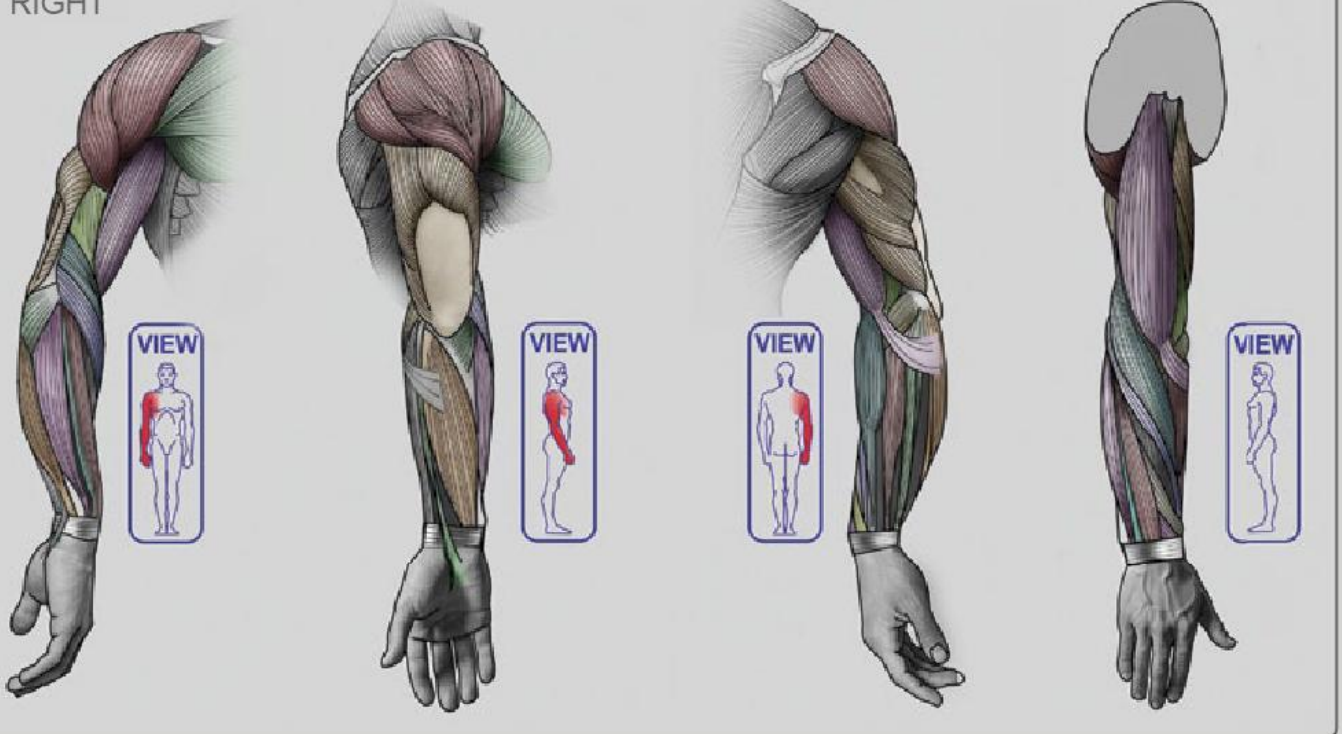
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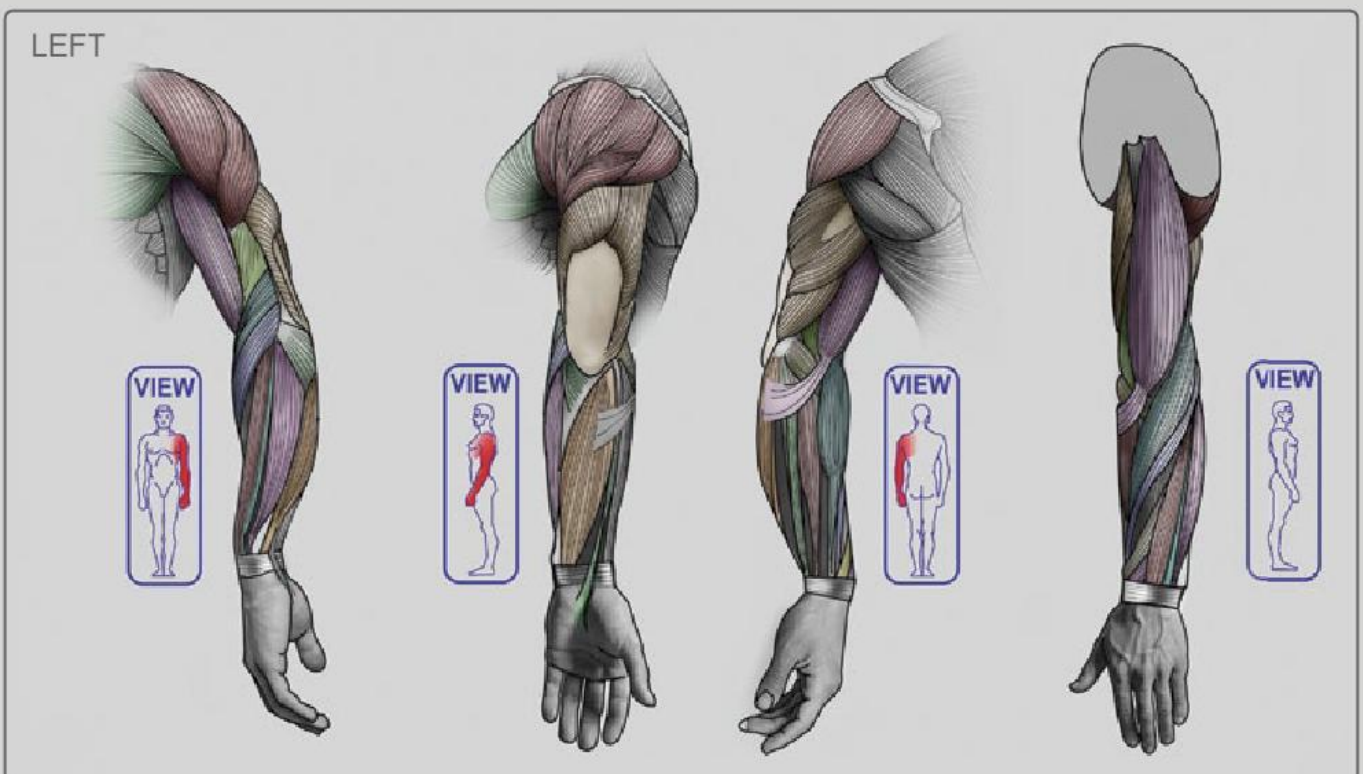
FORCED PRONATION OF THE UPPER LIMB

(WHEN THE FOREARM OR PALM FACES AWAY FROM THE TRUNK)

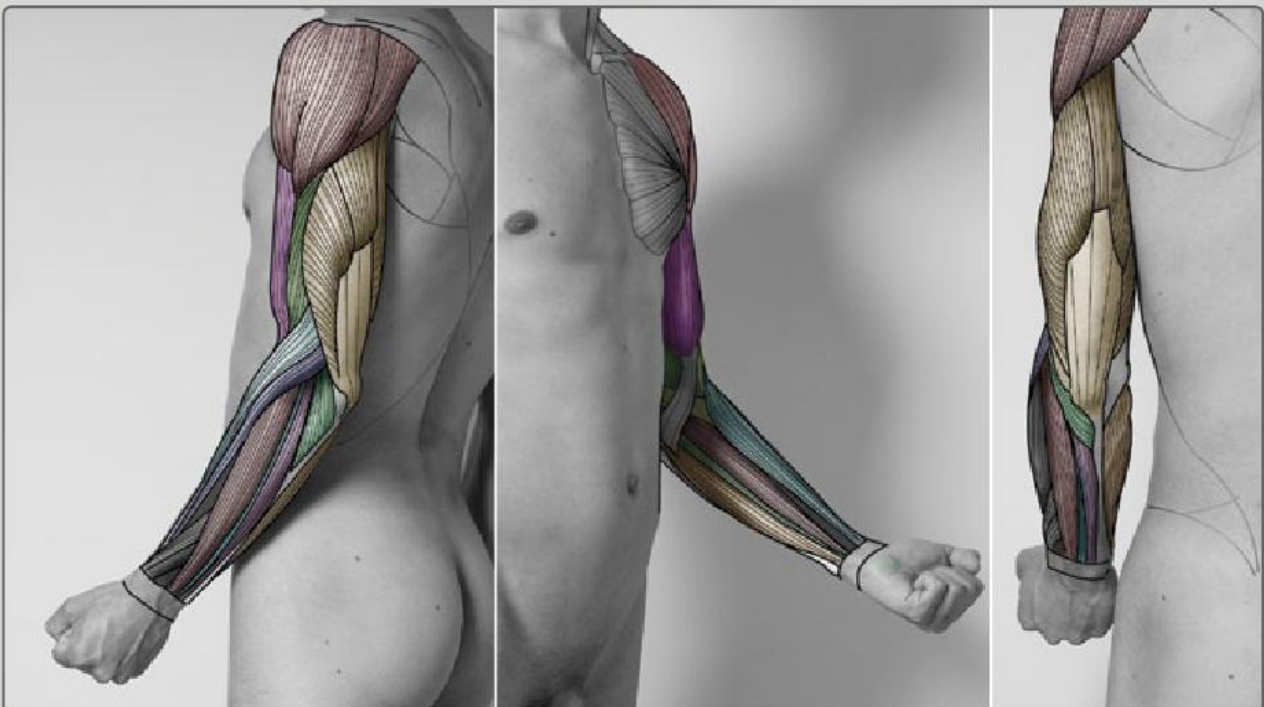
RIGHT



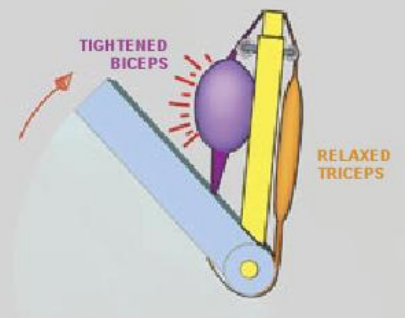
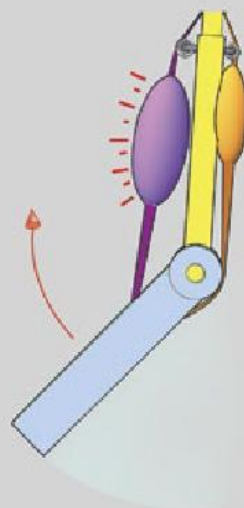
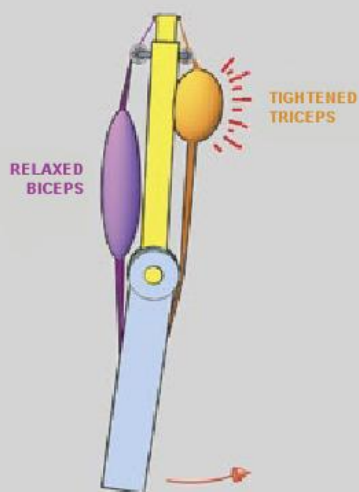
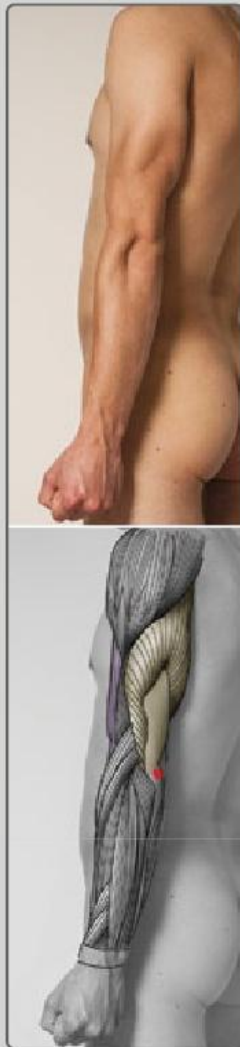
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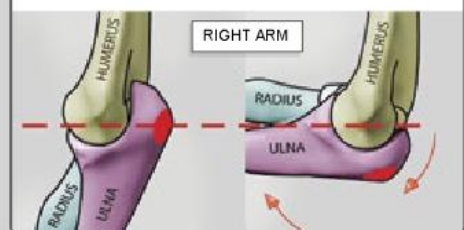
PARTIALLY FLEXED ARM (AS IF HOLDING AN OBJECT)



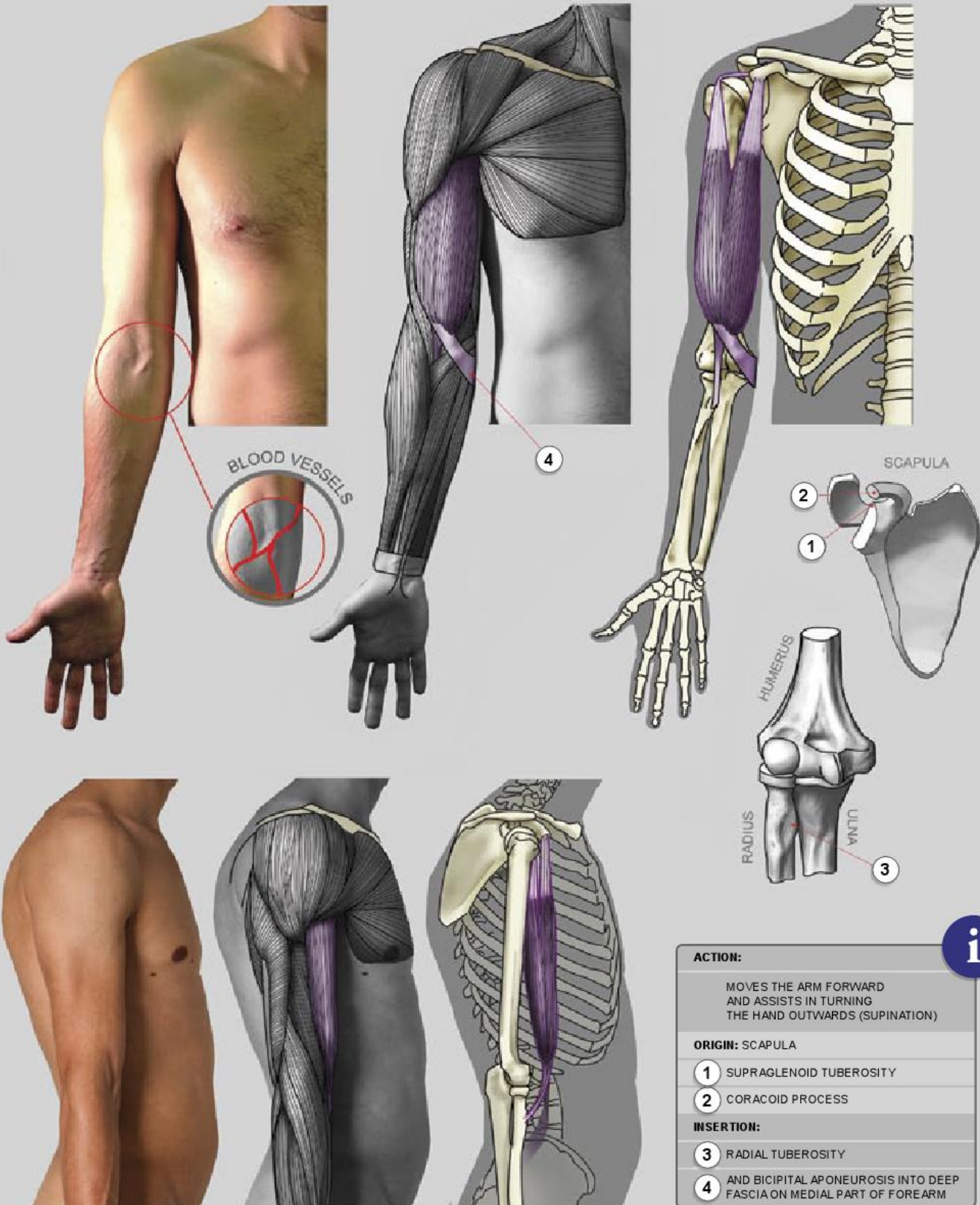
BICEPS AND TRICEPS IN ACTION



ELBOW BELONGS TO THE FOREARM.



BICEPS BRACHII MUSCLE



ACTION:

MOVES THE ARM FORWARD
AND ASSISTS IN TURNING
THE HAND OUTWARDS (SUPINATION)

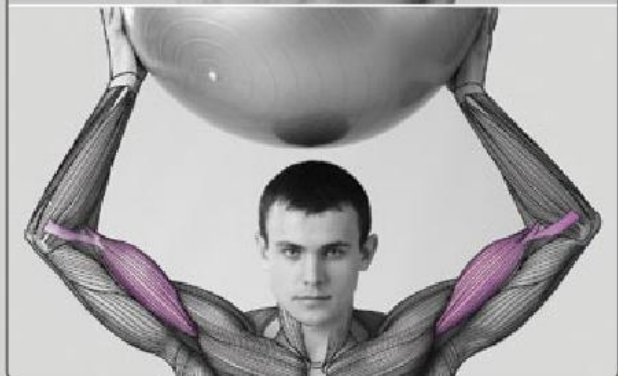
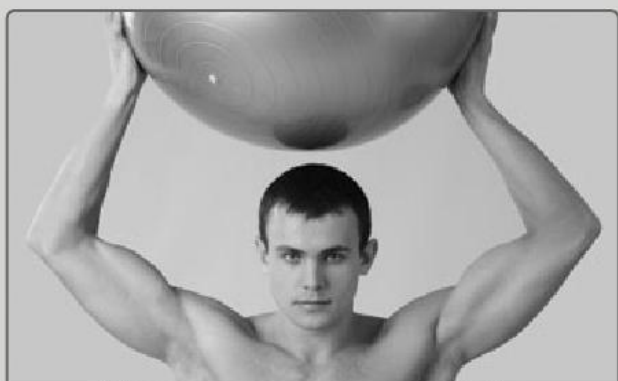
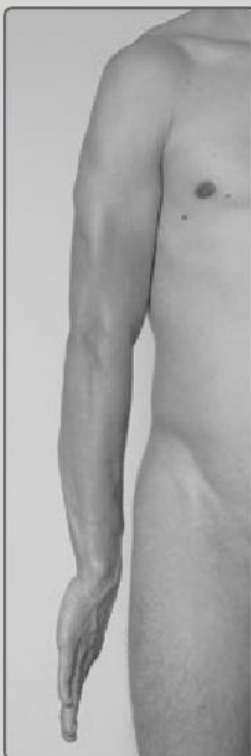
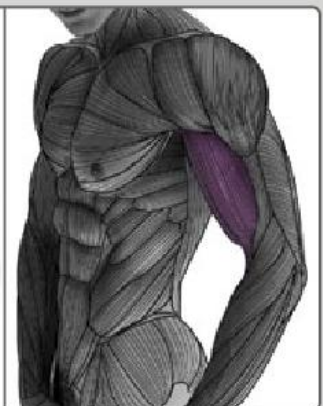
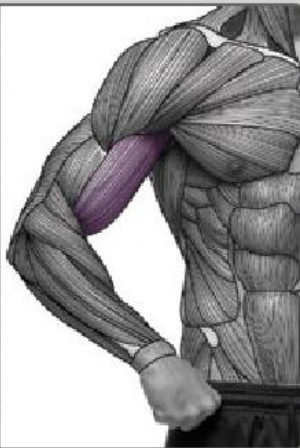
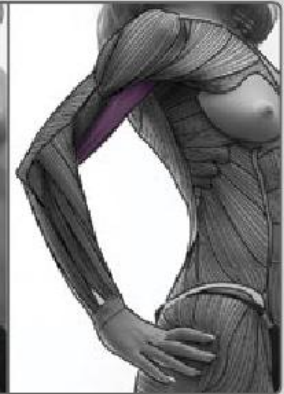
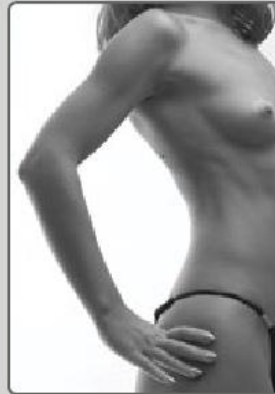
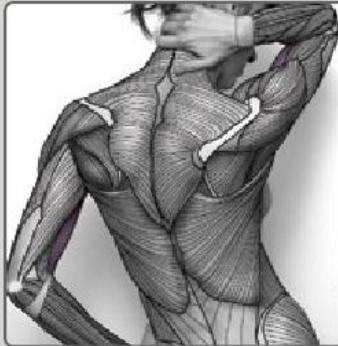
ORIGIN: SCAPULA

- 1 SUPRAGLENOID TUBEROSITY
- 2 CORACOID PROCESS

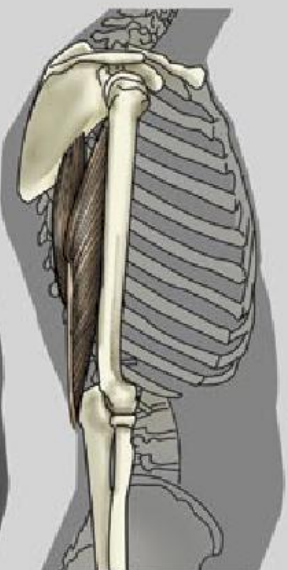
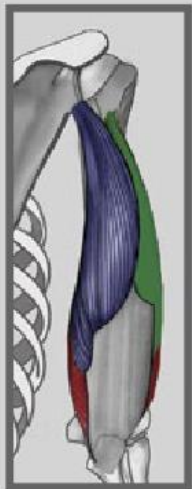
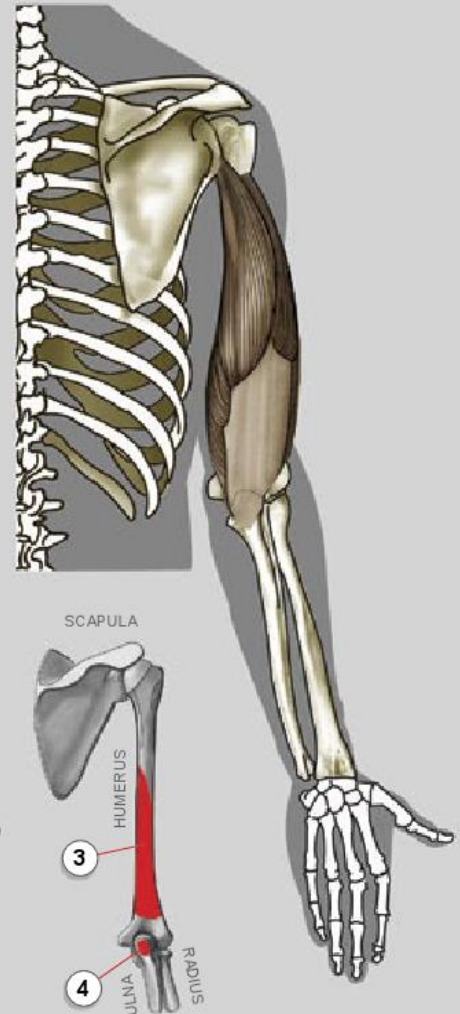
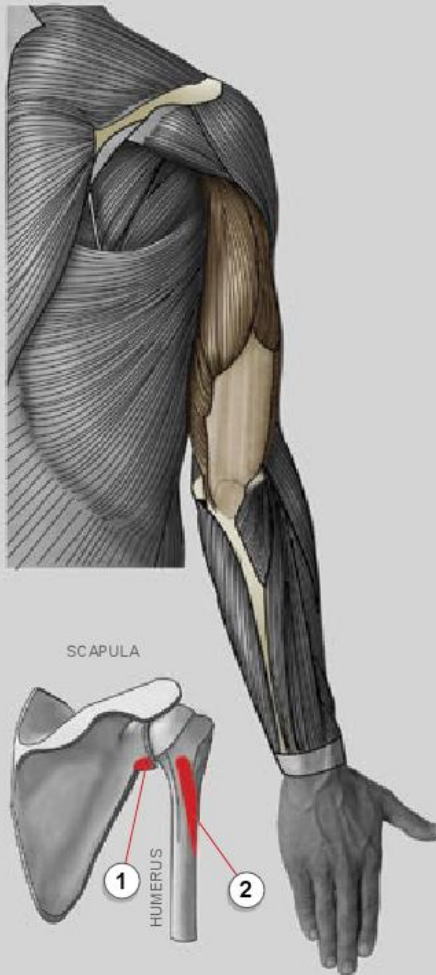
INSERTION:

- 3 RADIAL TUBEROSITY
- 4 AND BICIPITAL APONEUROSIS INTO DEEP FASCIA ON MEDIAL PART OF FOREARM

BICEPS BRACHII MUSCLE



TRICEPS BRACHII MUSCLE



ACTION:

EXTENDS FOREARM
LONG HEAD EXTENDS SHOULDER

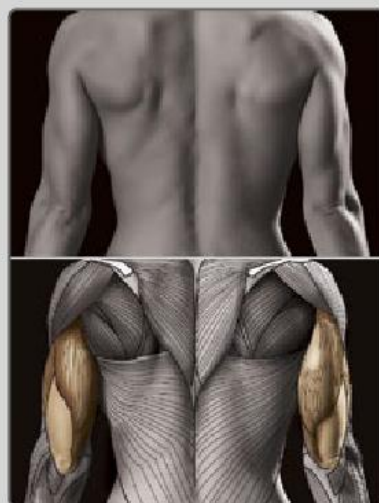
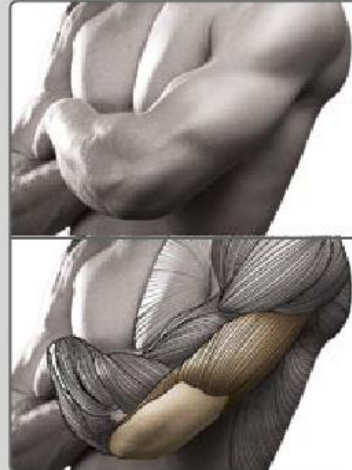
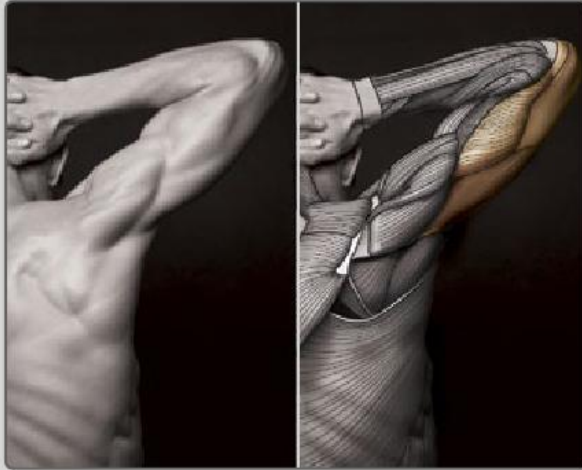
ORIGIN:

- 1 **LONG HEAD:**
INFRAGLENOID TUBERCLE OF SCAPULA
- 2 **LATERAL HEAD:**
ABOVE THE RADIAL SULCUS
- 3 **MEDIAL HEAD:**
BELOW THE RADIAL SULCUS

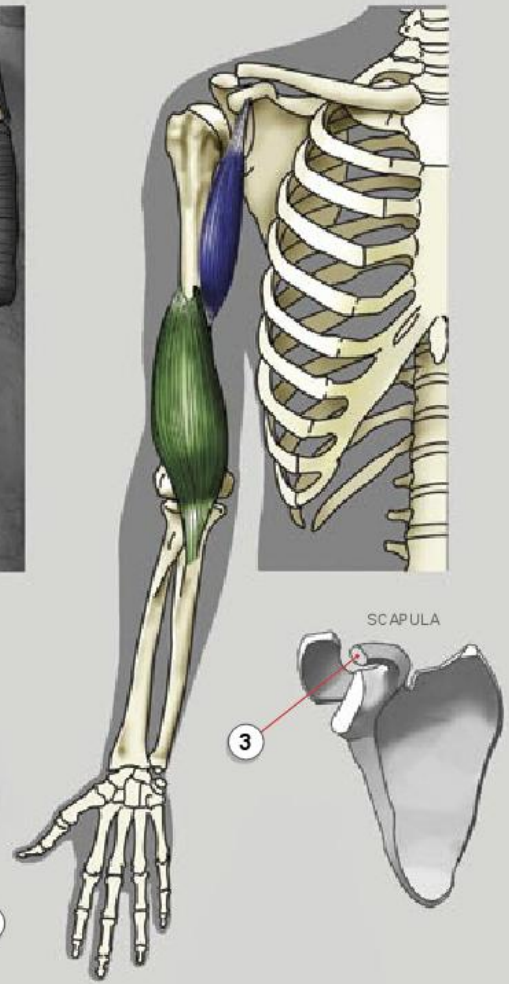
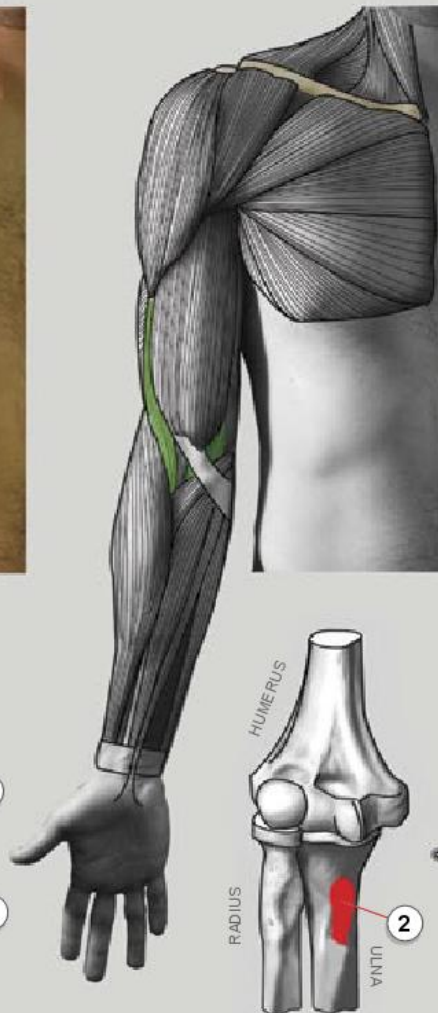
INSERTION:

- 4 OLECRANON PROCESS OF ULNA

TRICEPS BRACHII MUSCLE



BRACHIALIS AND CORACOBrachialis MUSCLES



BRACHIALIS

ACTION:

FLEXION AT ELBOW JOINT

ORIGIN:

1 ANTERIOR SURFACE OF THE HUMERUS

INSERTION:

2 CORONOID PROCESS AND THE TUBerosITY OF THE ULNA

CORACOBACHIALIS

ACTION:

ADDUCTS HUMERUS, FLEXES THE ARM AT GLENOHUMERAL JOINT

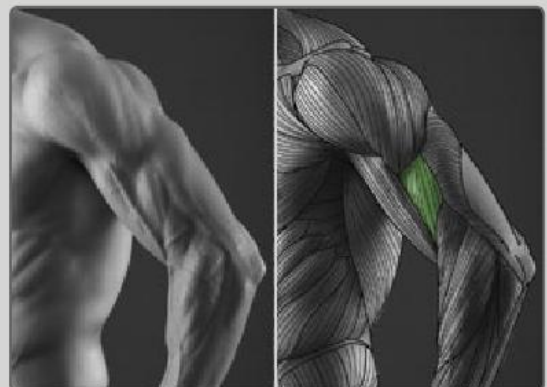
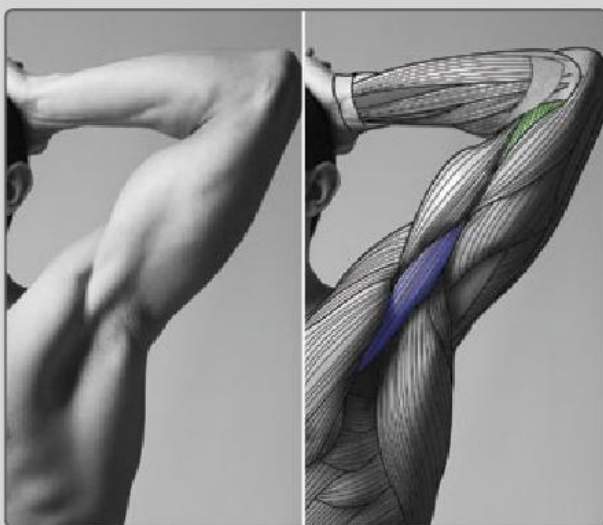
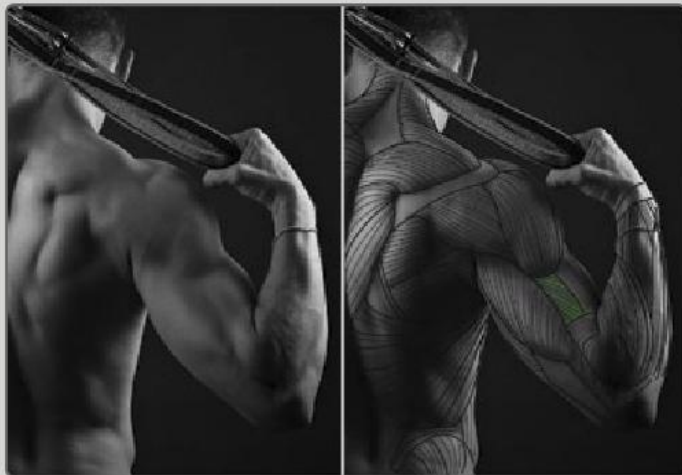
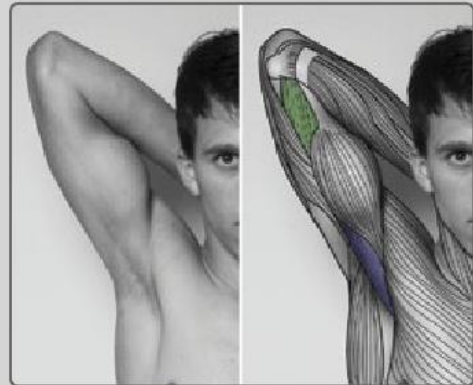
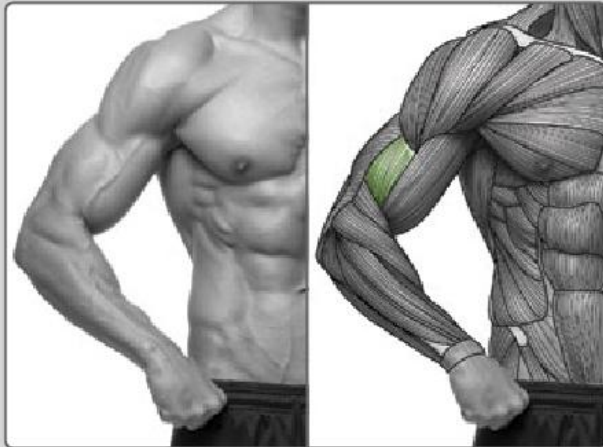
ORIGIN:

3 CORACOID PROCESS OF SCAPULA

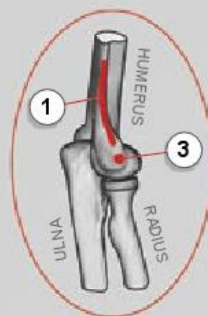
INSERTION:

4 MEDIAL HUMERUS

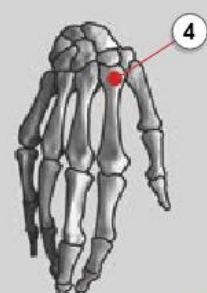
BRACHIALIS AND CORACOBrachialis MUSCLES



BRACHIORADIALIS AND EXTENSOR CARPI RADIALIS LONGUS



BACK VIEW OF
RIGHT HAND



BRACHIORADIALIS

ACTION:

FLEXION OF ELBOW

ORIGIN:

1 LATERAL SUPRACONDYLAR
RIDGE OF THE HUMERUS

INSERTION:

2 DISTAL RADIUS
(RADIAL STYLOID PROCESS)

EXTENSOR CARPI RADIALIS LONGUS

ACTION:

EXTENSOR AT THE WRIST JOINT,
ABDUCTS THE HAND AT THE WRIST

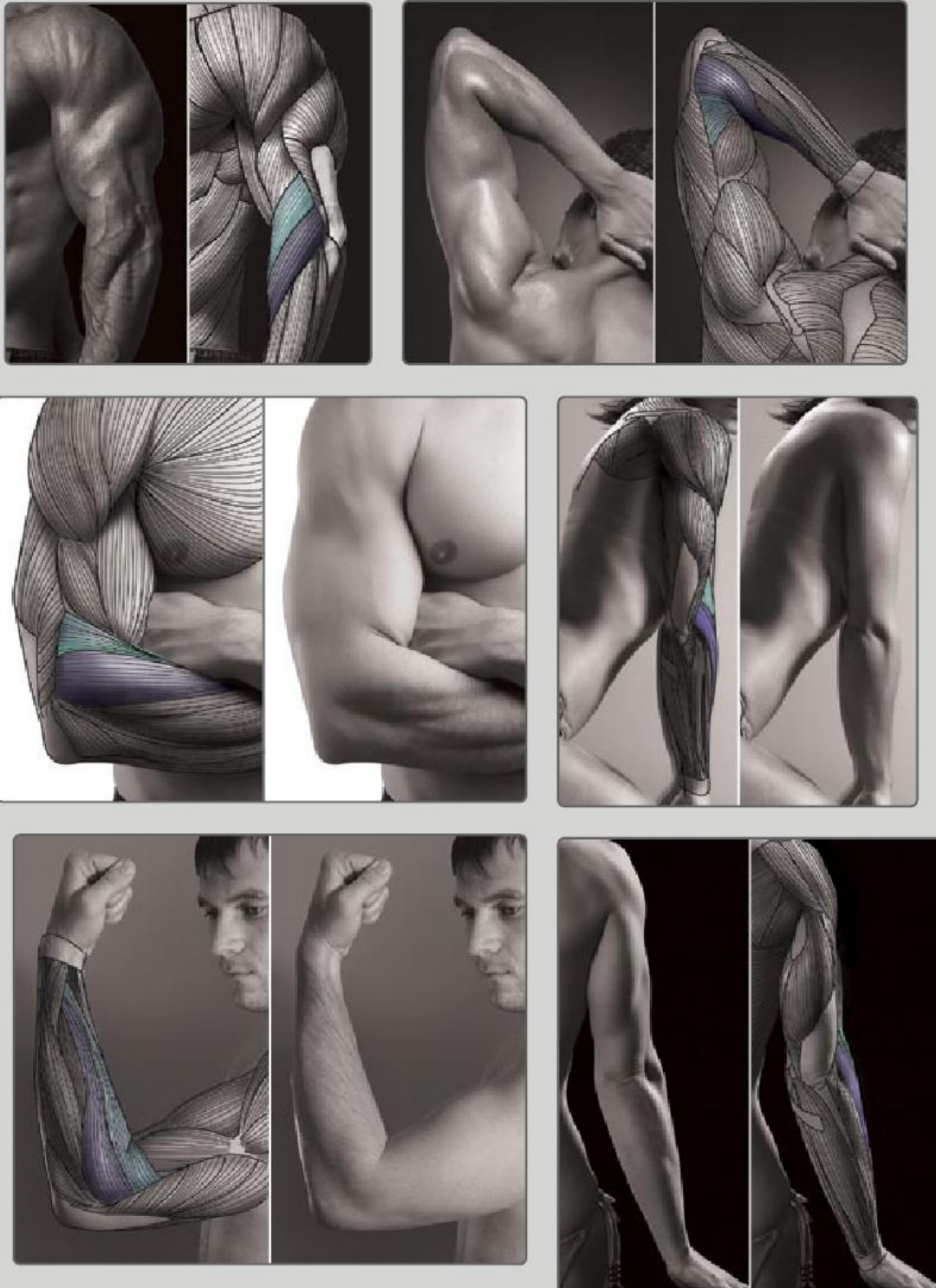
ORIGIN:

3 LATERAL SUPRACONDYLAR RIDGE

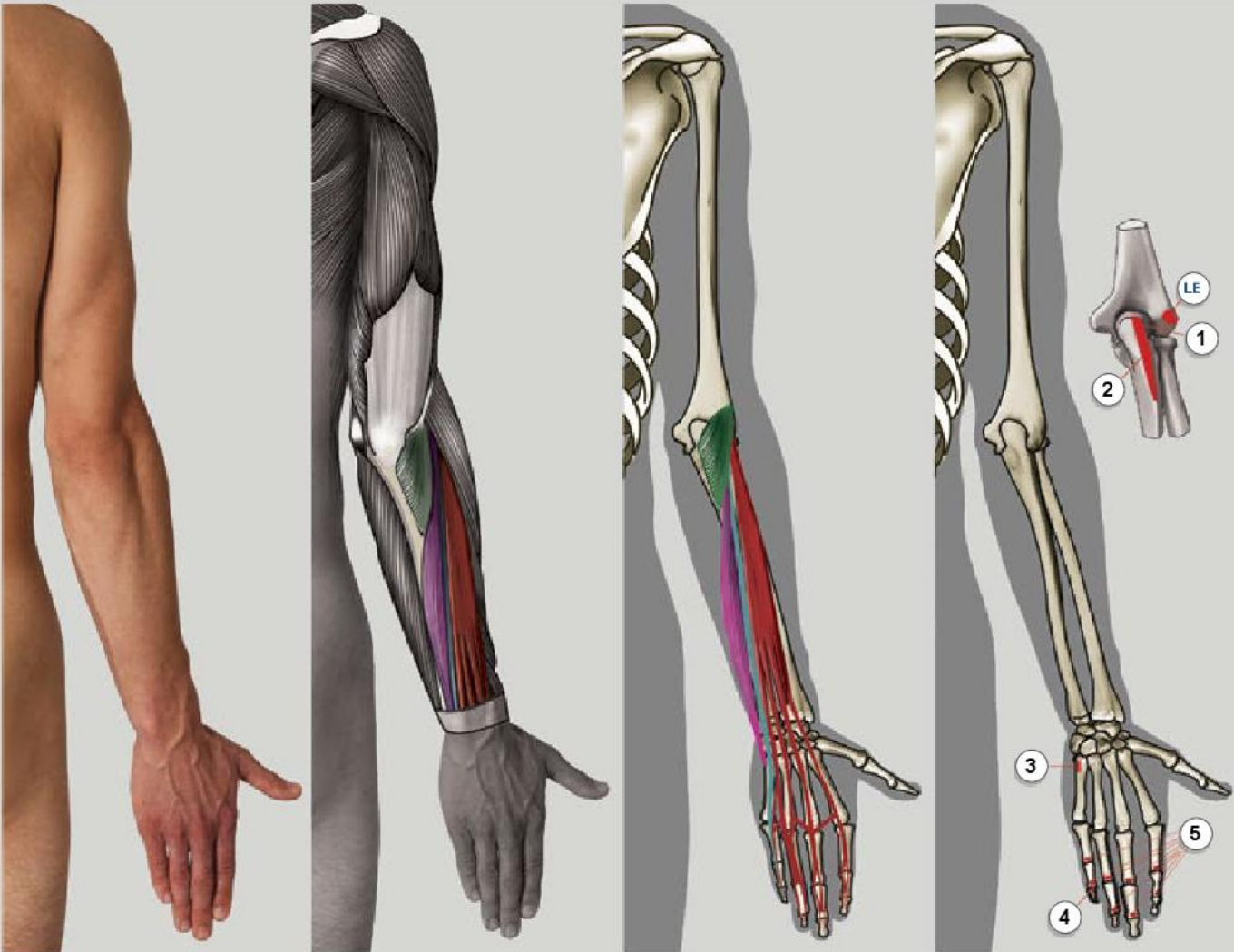
INSERTION:

4 2nd METACARPAL

BRACHIORADIALIS AND EXTENSOR CARPI RADIALIS LONGUS



ANCONEUS, EXTENSOR CARPI ULNARIS, EXTENSOR DIGITI MINIMI AND EXTENSOR DIGITORUM MUSCLES



ANCONEUS

ACTION:

STABILIZES THE ELBOW

ORIGIN:

LE LATERAL EPICONDYLE OF THE HUMERUS

INSERTION:

- 1** LATERAL SURFACE OF THE OLECRANON PROCESS
- 2** SUPERIOR PART OF THE POSTERIOR ULNADISTALLY

EXTENSOR DIGITI MINIMI

ACTION:

EXTENDS THE WRIST AND THE LITTLE FINGER AT ALL JOINTS

ORIGIN:

LE LATERAL EPICONDYLE OF THE HUMERUS

INSERTION:

- 4** AT THE EXTENSOR EXPANSION ON PROXIMAL PHALANX OF THE LITTLE FINGER

EXTENSOR CARPI ULNARIS

ACTION:

EXTENDS AND ADDUCTS THE WRIST

ORIGIN:

LE LATERAL EPICONDYLE OF THE HUMERUS, ULNA

INSERTION:

- 3** 5th METACARPAL

EXTENSOR DIGITORUM

ACTION:

EXTENDS HAND, WRIST AND FINGERS

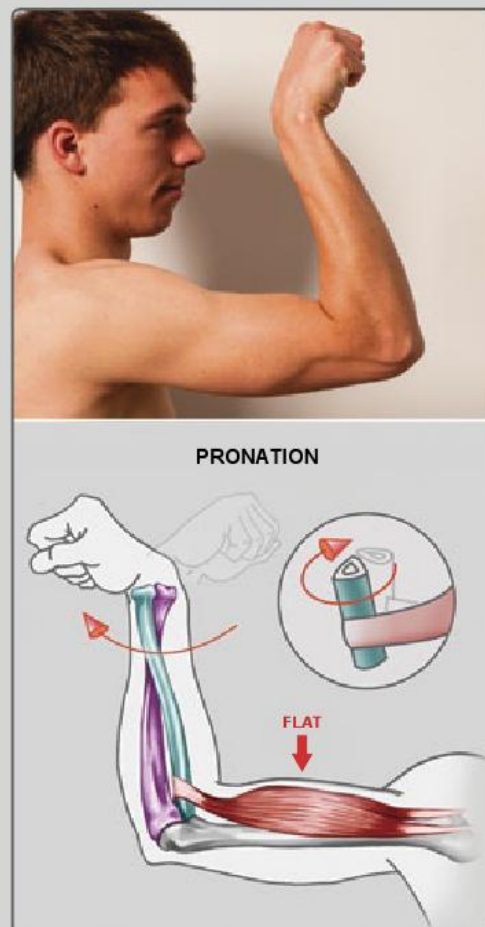
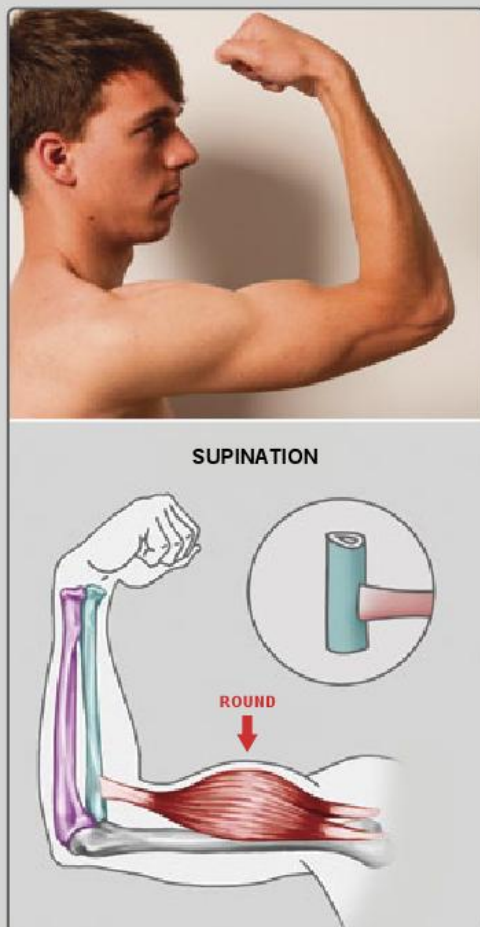
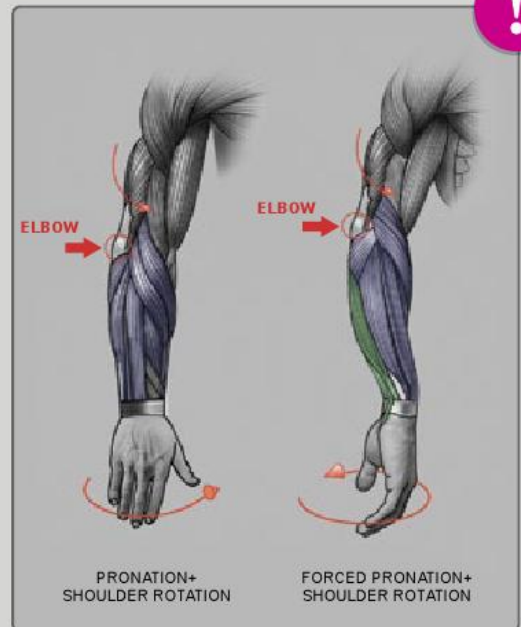
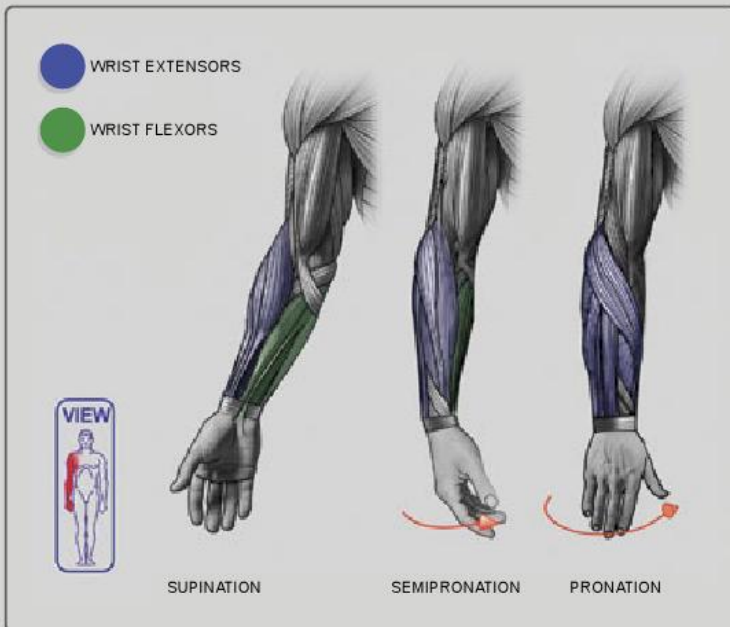
ORIGIN:

LE LATERAL EPICONDYLE OF THE HUMERUS

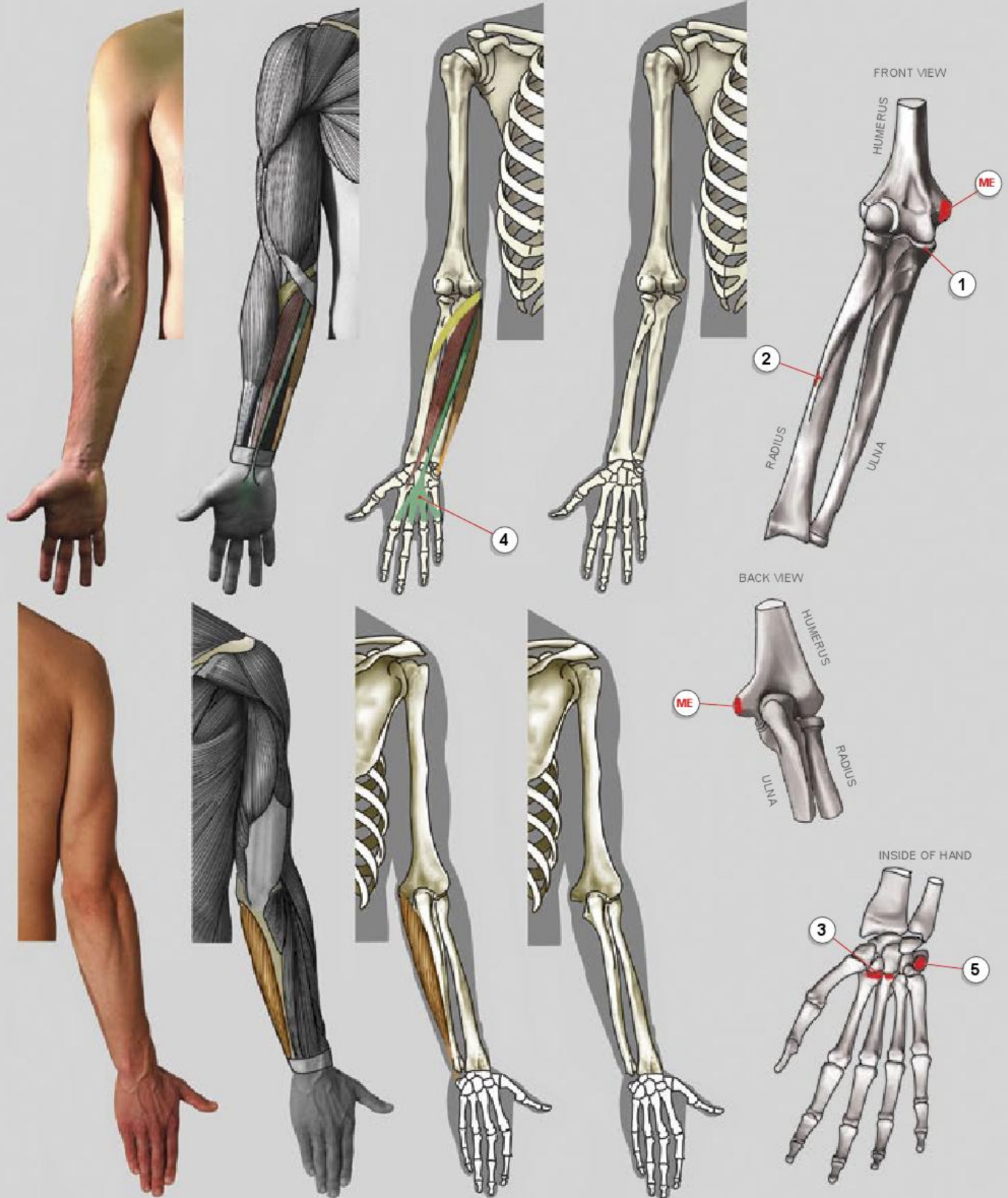
INSERTION:

- 5** EXTENSOR EXPANSION OF MIDDLE AND DISTAL PHALANGES OF THE 2nd, 3rd, 4th AND 5th FINGERS

SUPINATION AND PRONATION



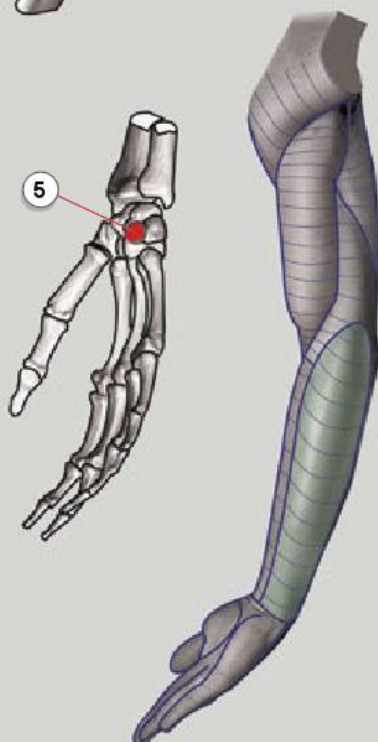
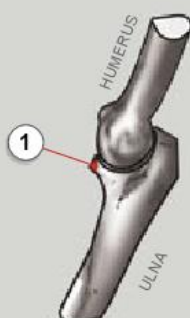
FLEXOR MUSCLES



FLEXOR MUSCLES (FROM INNER SIDE)



ALL FLEXORS ARISE FROM THE **MEDIAL EPICONDYLE OF THE HUMERUS** (ME).



PRONATOR TERES

ACTION:

PRONATION OF FOREARM, FLEXES ELBOW

ORIGIN:



MEDIAL EPICONDYLE OF HUMERUS (COMMON FLEXOR TENDON)



ULNAR HEAD: CORONOID PROCESS OF ULNA

INSERTION:



MIDDLE OF THE LATERAL SURFACE OF THE RADIUS

FLEXOR CARPI RADIALIS

ACTION:

FLEXION AND ABDUCTION AT WRIST

ORIGIN:



MEDIAL EPICONDYLE OF HUMERUS (COMMON FLEXOR TENDON)

INSERTION:



BASE OF SECOND AND THIRD METACARPAL BONES

PALMARIS LONGUS

ACTION:

WRIST FLEXOR

ORIGIN:



MEDIAL EPICONDYLE OF HUMERUS (COMMON FLEXOR TENDON)

INSERTION:



PALMAR APONEUROSIS

FLEXOR CARPI ULNARIS

ACTION:

FLEXION AND ABDUCTION AT WRIST

ORIGIN:



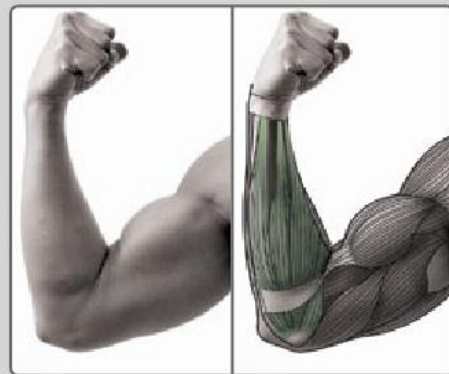
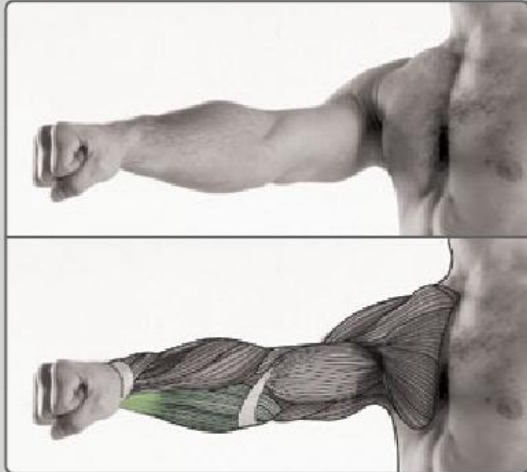
MEDIAL EPICONDYLE OF HUMERUS (COMMON FLEXOR TENDON)

INSERTION:

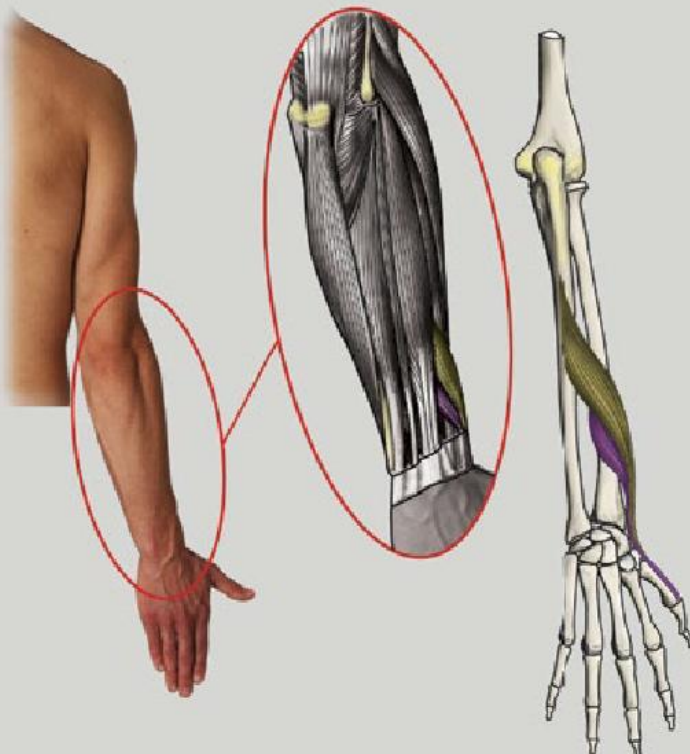
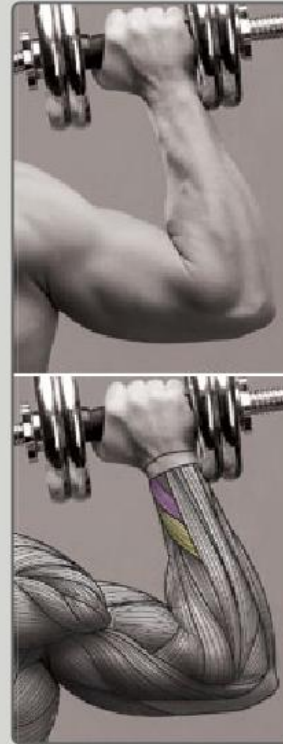
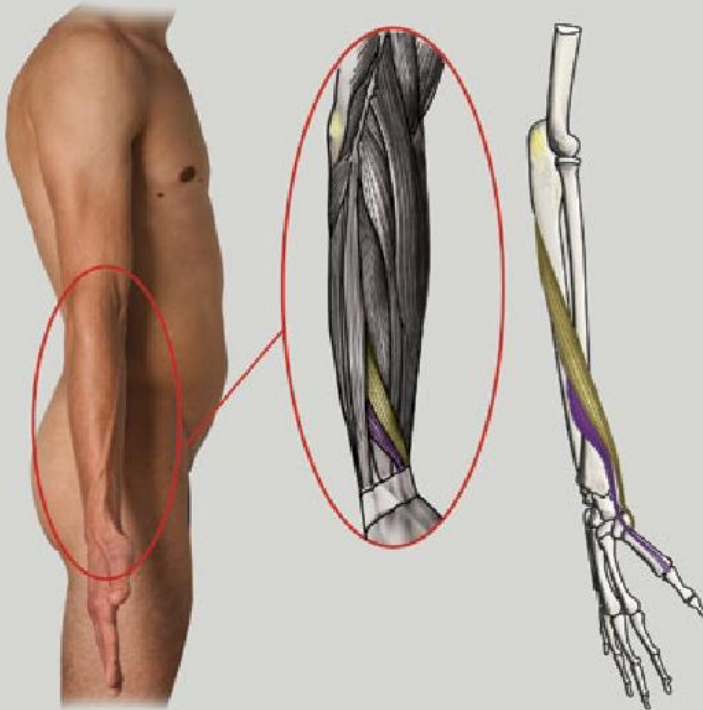


PISIFORM

FLEXOR MUSCLES



ABDUCTOR POLLICIS LONGUS AND EXTENSOR POLLICIS BREVIS MUSCLES



ABDUCTOR POLLICIS LONGUS

ACTION:

ABDUCTION, EXTENSION OF THUMB

ORIGIN:

ULNA, RADIUS,
INTEROSSEOUS MEMBRANE

INSERTION:

FIRST METACARPAL

EXTENSOR POLLICIS BREVIS

ACTION:

EXTENSION OF THUMB AT
METACARPOPHALANGEAL JOINT

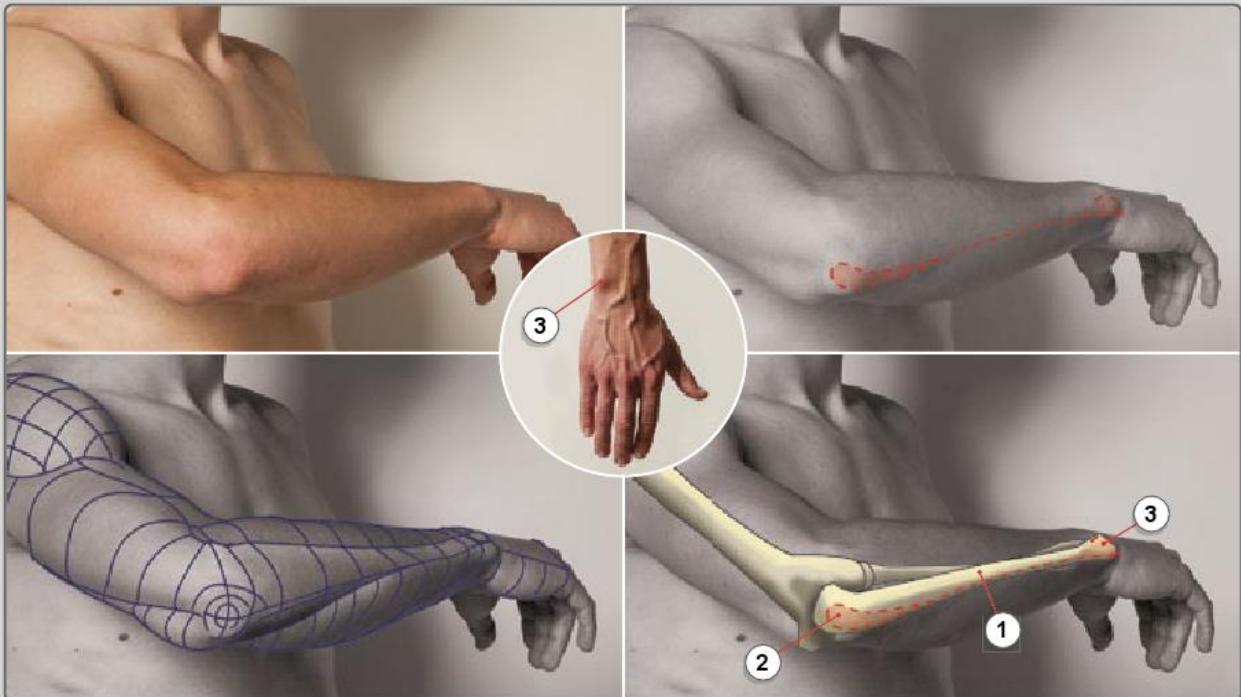
ORIGIN:

RADIUS AND THE INTEROSSEOUS MEMBRANE

INSERTION:

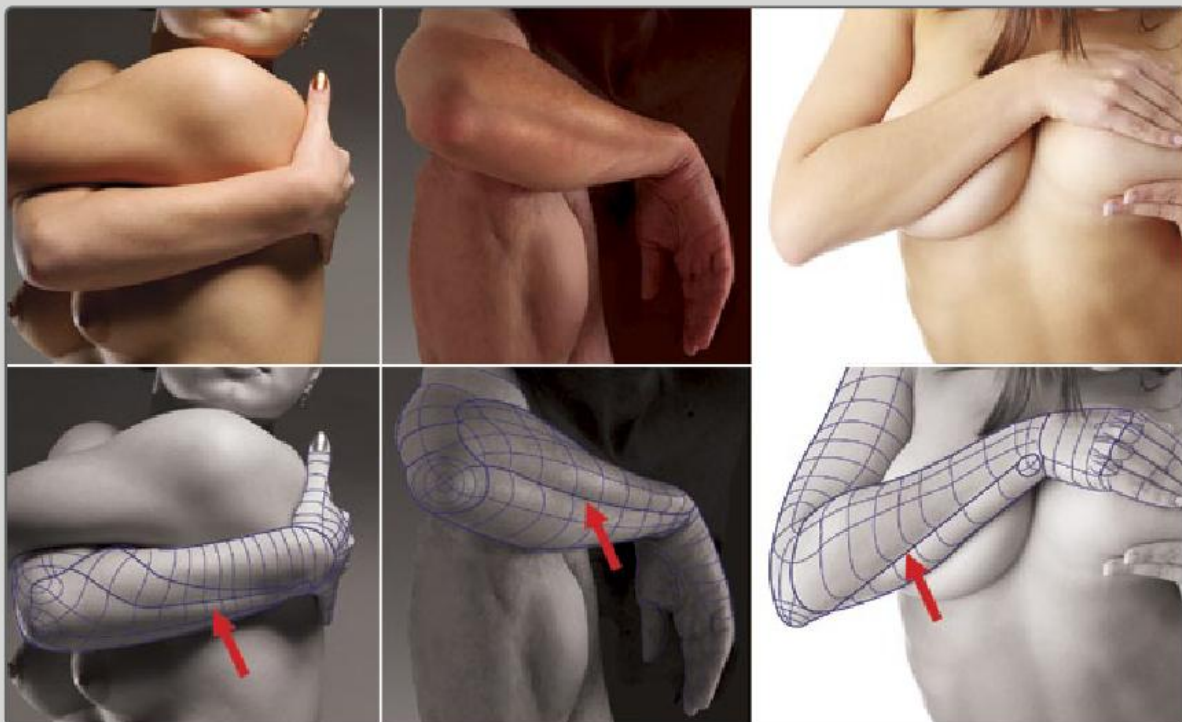
THUMB, PROXIMAL PHALANX

THE BODY OF THE ULNA

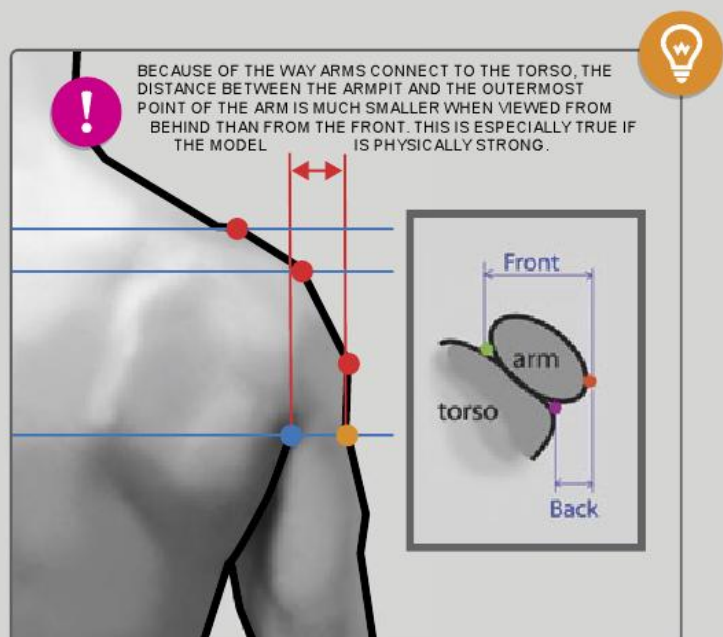
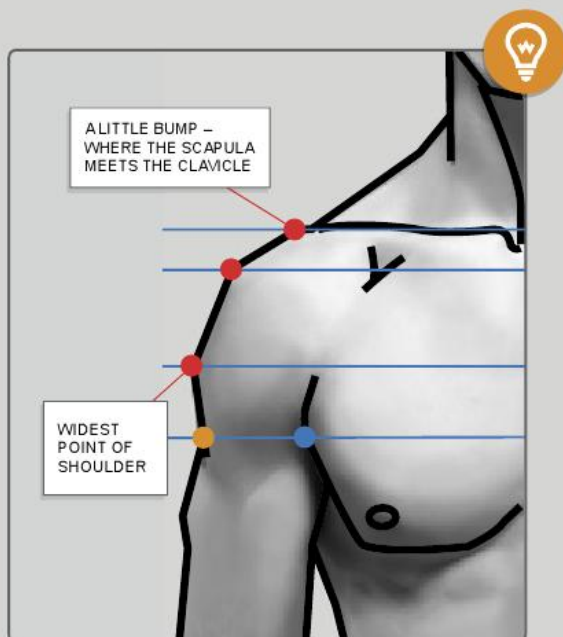
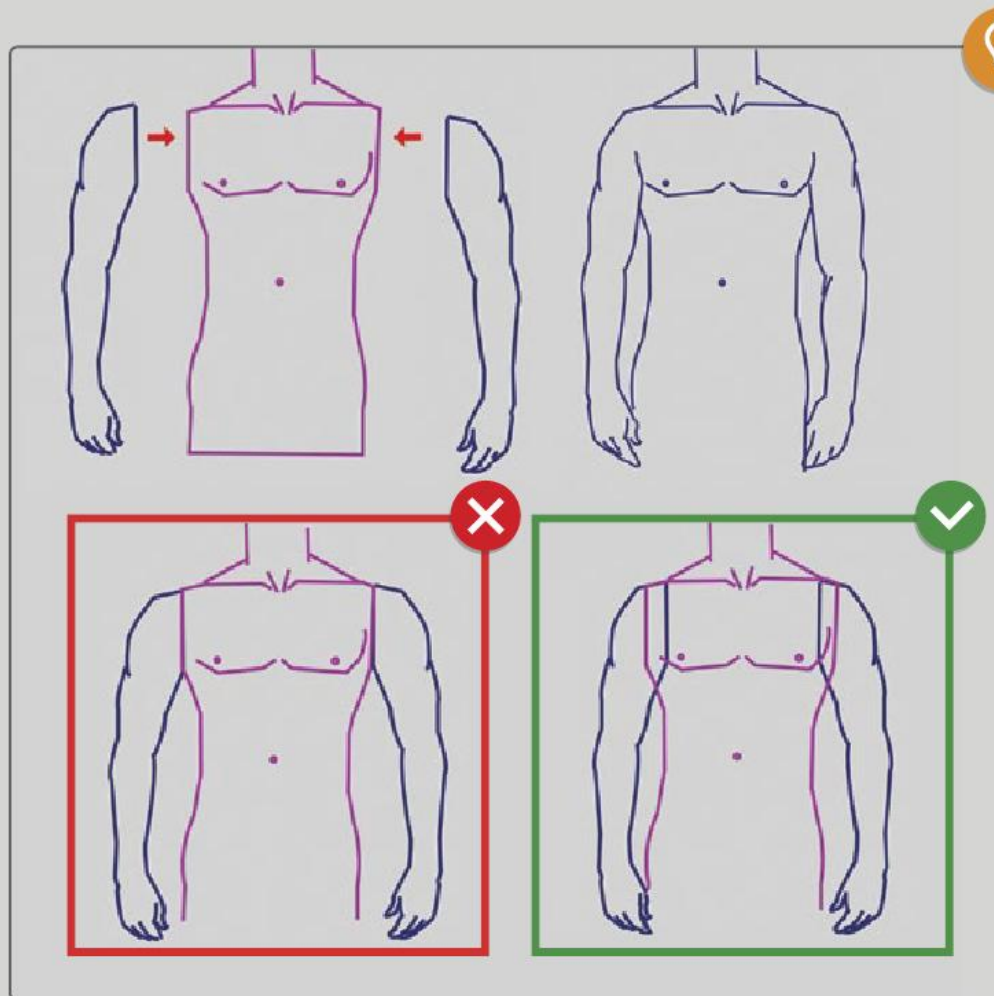


THE BODY OF **THE ULNA** ① IS AN IMPORTANT LANDMARK. WHEREVER YOU TURN THE HAND, THE ULNA ALWAYS EXTENDS FROM **THE ELBOW** ② TO LITTLE FINGER SIDE OF THE HAND, WHERE IT IS VISIBLE AS **A BUMP** ③ IT IS ALWAYS VISIBLE AS A RIDGE OR FURROW. BOTH ENDS OF THE BONE ARE NOT COVERED BY MUSCLES, ONLY BY THIN LAYER OF SKIN.

i



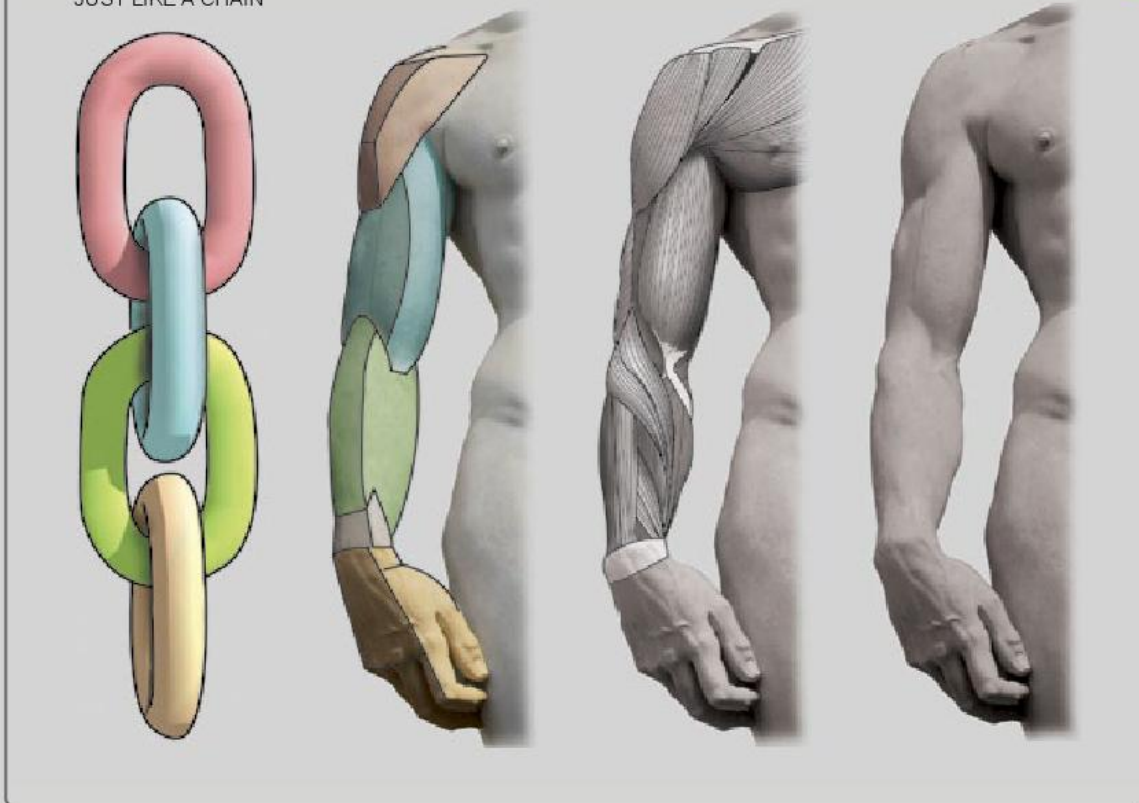
HOW ARMS CONNECT TO THE BODY



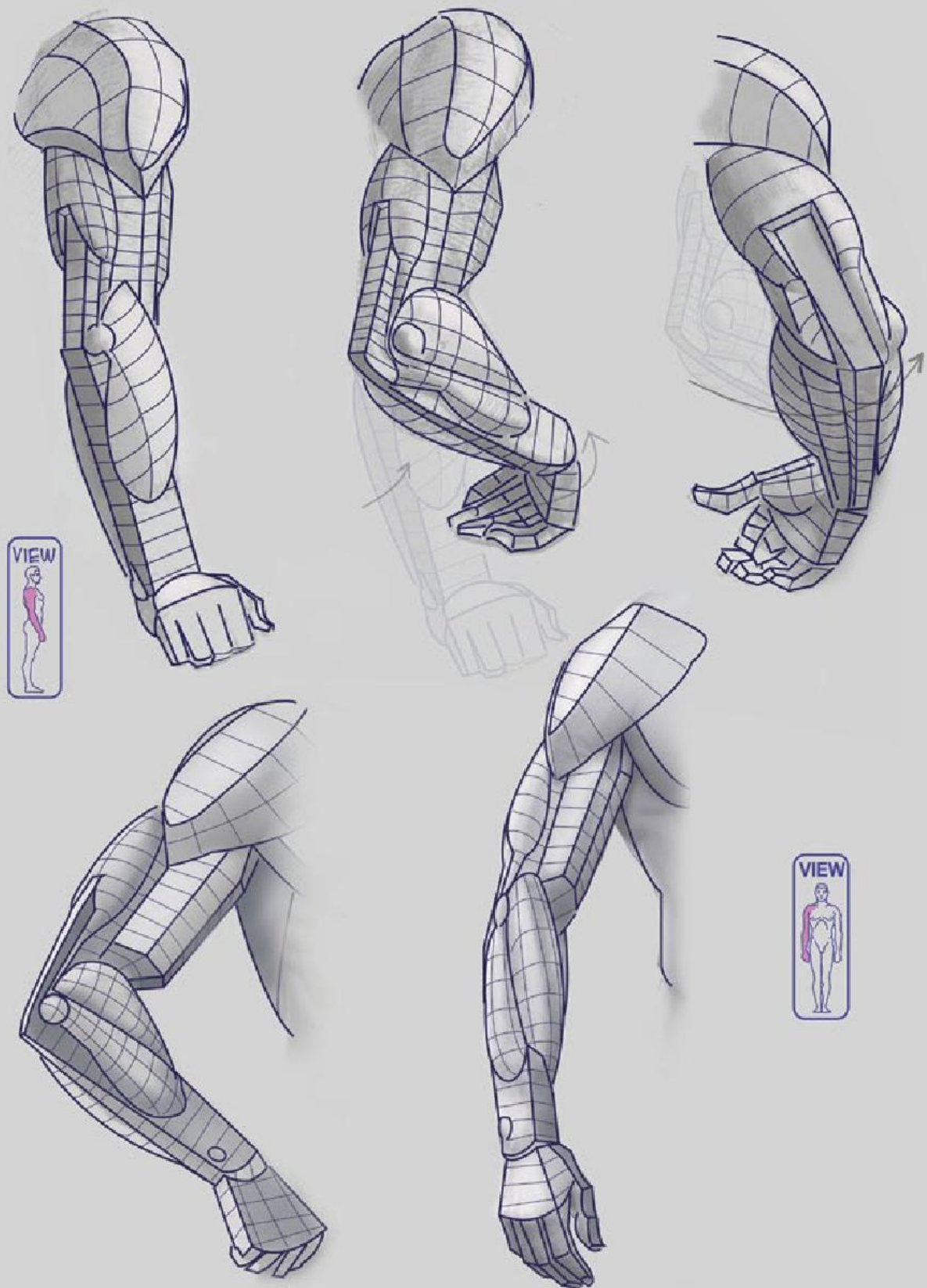
BLOCKING OUT A SEMIPRONATED ARM



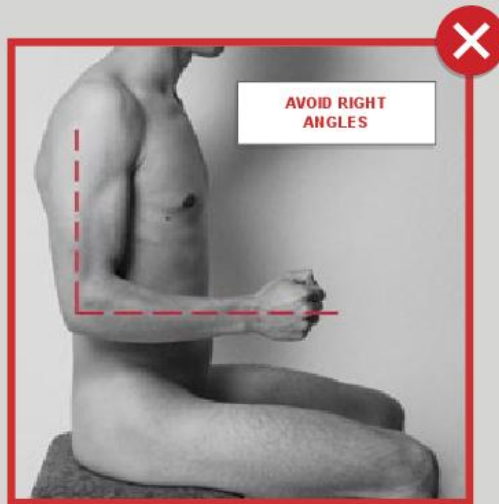
JUST LIKE A CHAIN



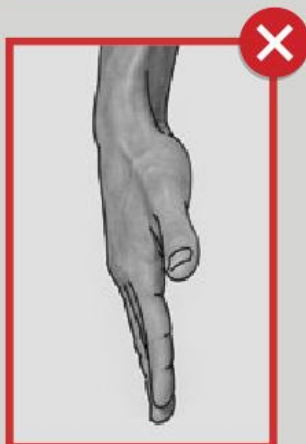
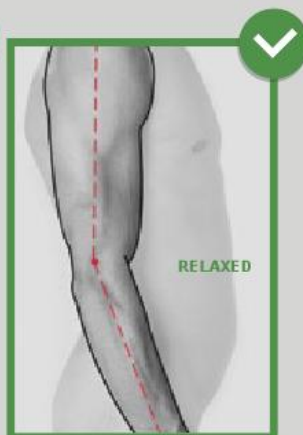
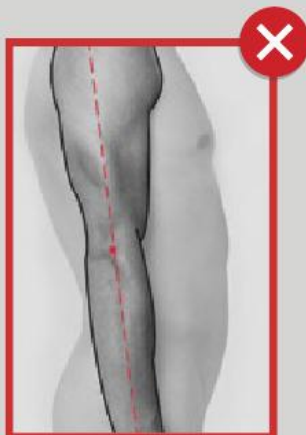
BLOCKING OUT AN ARM



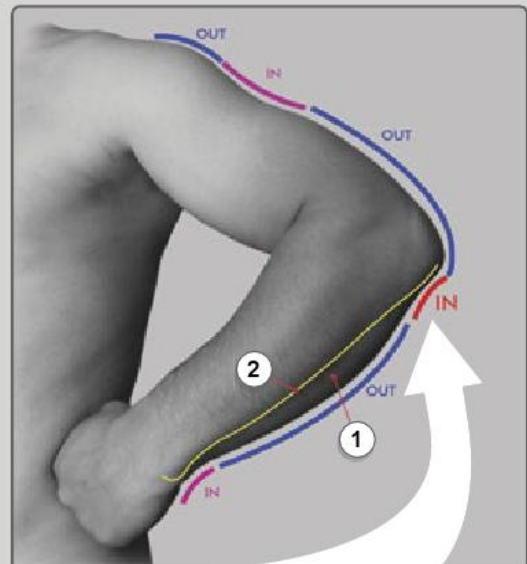
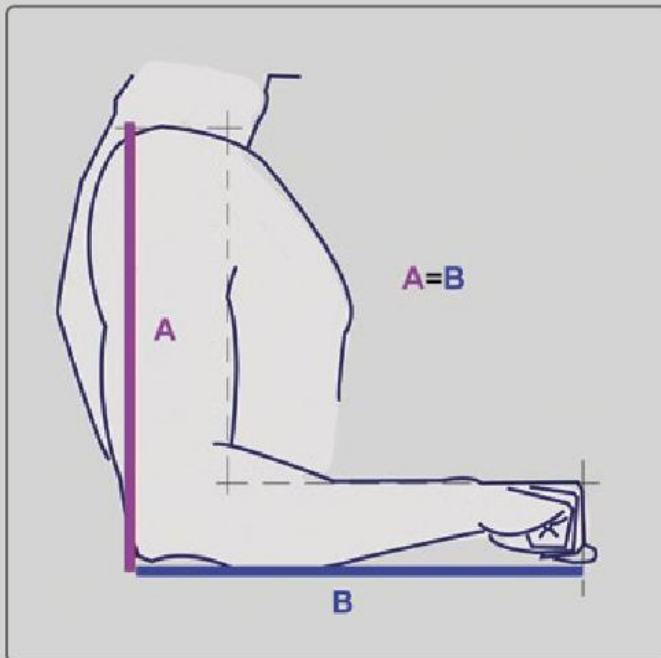
HOW DO YOU MAKE ARMS AND HANDS LOOK LESS STIFF?



DON'T MAKE ARMS OR HANDS STRAIGHT WITHOUT SPECIAL REASON.

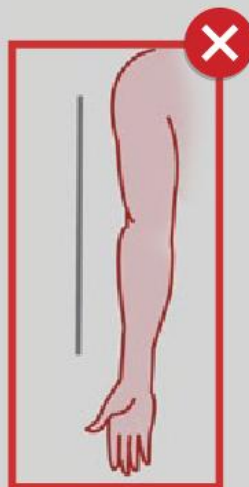


HANDY TIPS



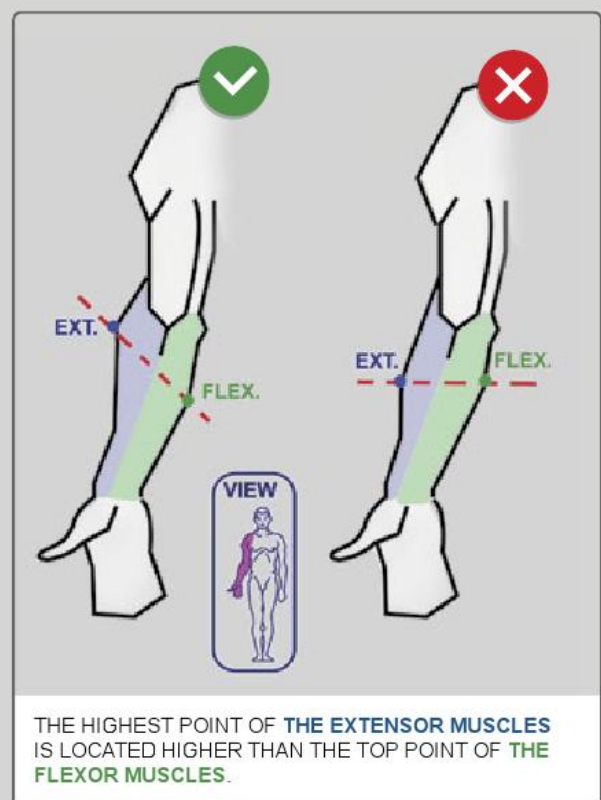
BODY SILHOUETTE APPEARS TO BEND **INWARD** RIGHT BELOW THE ELBOW DUE TO THE FLEXOR CARPI ULNARIS MUSCLE **①** POPPING **OUTWARD**.

ULNA BONE **②** REMAINS STRAIGHT.



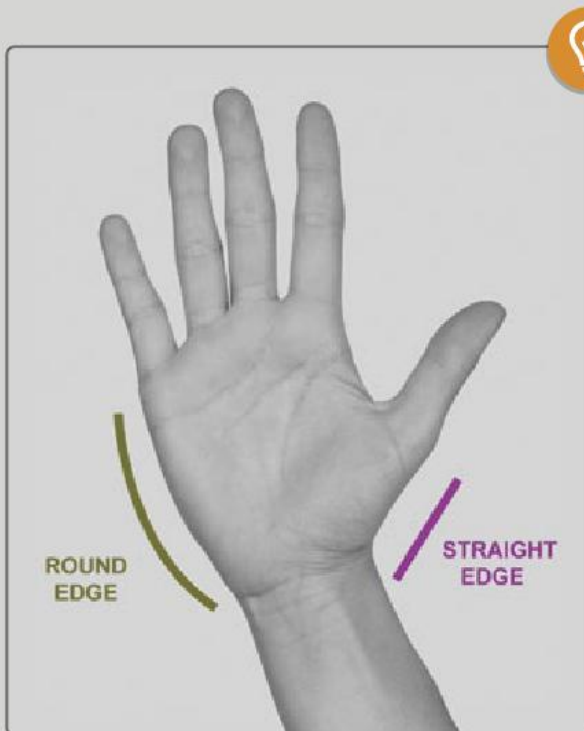
WHEN ARMS ARE HELD OUT AT THE SIDES WITH PALMS FACING FORWARD (SUPINATION), FOREARM AND HAND ARE ABOUT 5 TO 15 DEGREES AWAY FROM THE BODY. THIS IS CALLED "THE CARRYING ANGLE".

FEMALE ARMS HAVE A GREATER **C.A.**

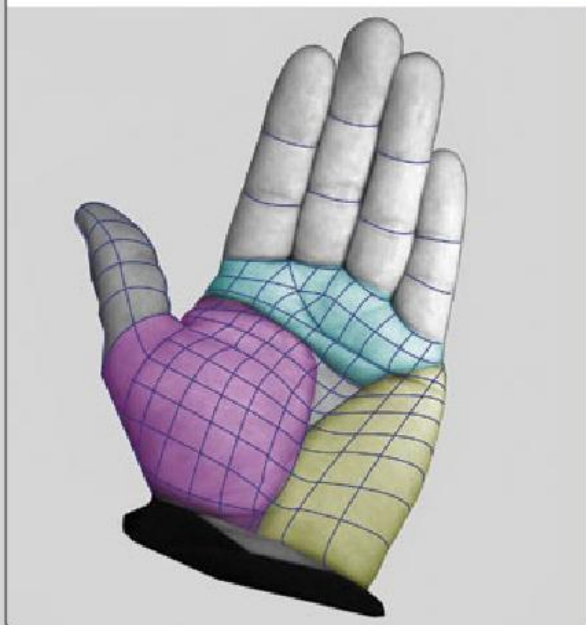


THE HIGHEST POINT OF **THE EXTENSOR MUSCLES** IS LOCATED HIGHER THAN THE TOP POINT OF **THE FLEXOR MUSCLES**.

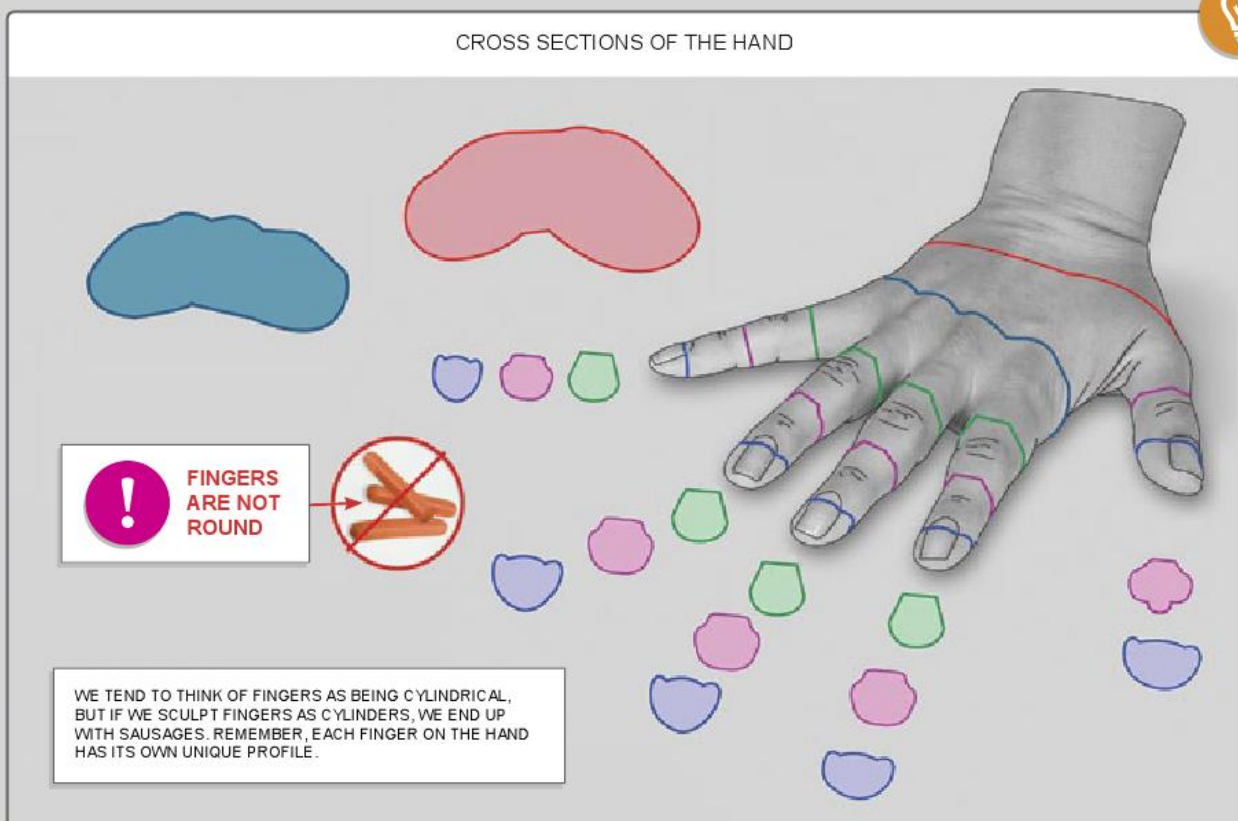
SHAPES OF THE HAND



PALM IS MADE OF 3 PADS



CROSS SECTIONS OF THE HAND



IDEALIZED HAND PROPORTIONS

SIZE OF AN ADULT'S HAND



MAKE SURE YOU ARE MODELING THE HAND LARGE ENOUGH.

IDEALLY, HAND IS THE SAME SIZE AS FACE (FROM TIP OF CHIN TO HAIRLINE).

BABY

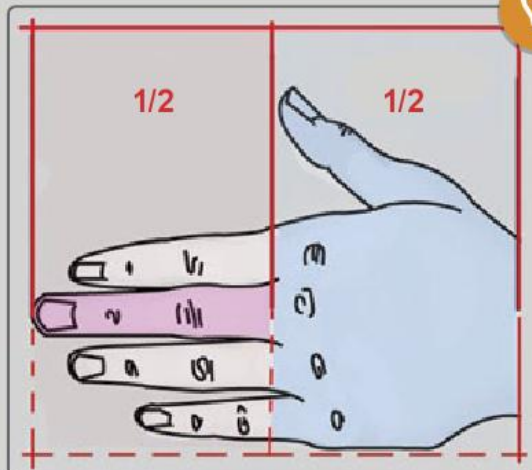


LENGTH OF HAND IS THE DISTANCE FROM CHIN TO EYEBROW LINE.

TEEN

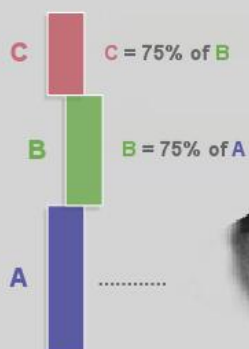


LENGTH OF HAND IS THE DISTANCE FROM CHIN TO THE MIDDLE OF FOREHEAD.

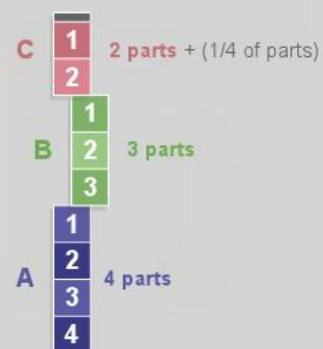


THERE ARE TWO METHODS YOU CAN USE TO CALCULATE FINGER LENGTH.

1st METHOD



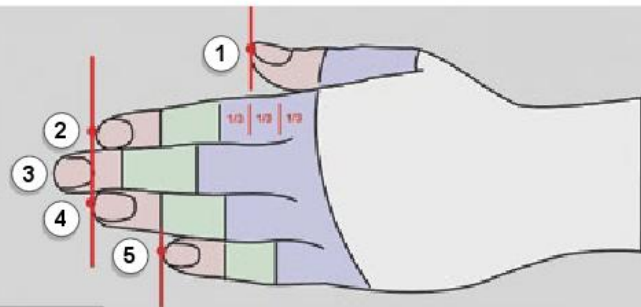
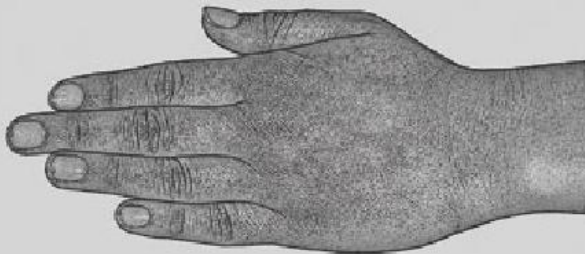
2nd METHOD (9+1/4 parts)



HAND

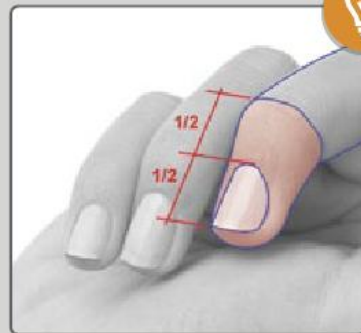
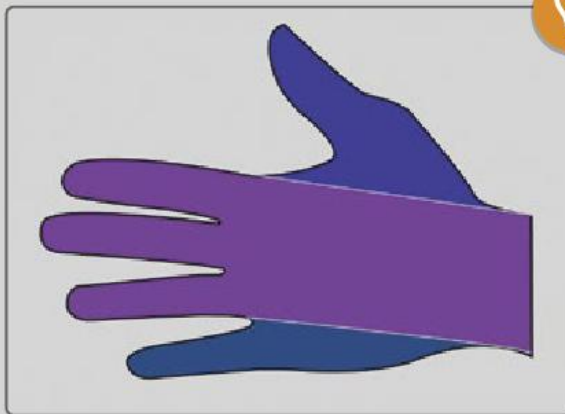
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FINGER LENGTHS OF AN IDEALIZED HAND

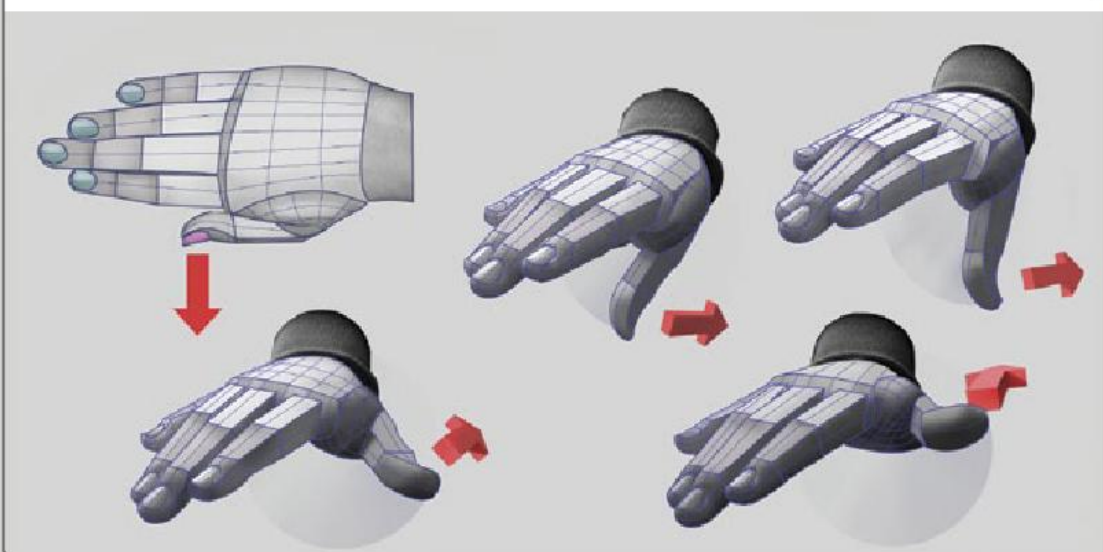


- ① THUMB DOES NOT POSSESS A MIDDLE (INTERMEDIATE) PHALANX!
 ② ③ ④ ⑤ FINGERS CONSIST OF 3 PHALANGES: PROXIMAL, MIDDLE AND DISTAL.

② = ④

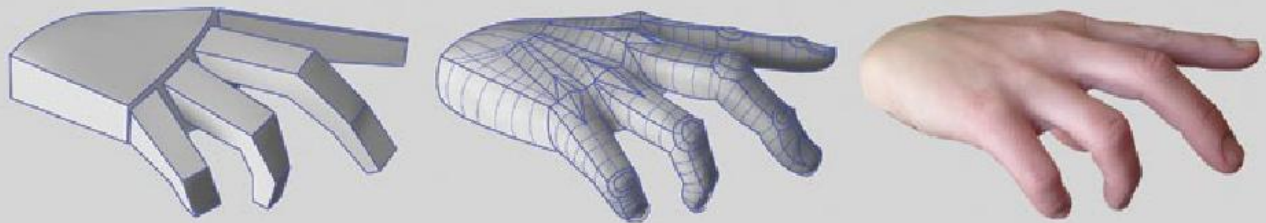


THUMB NAIL FACES A DIFFERENT DIRECTION THAN OTHER NAILS.

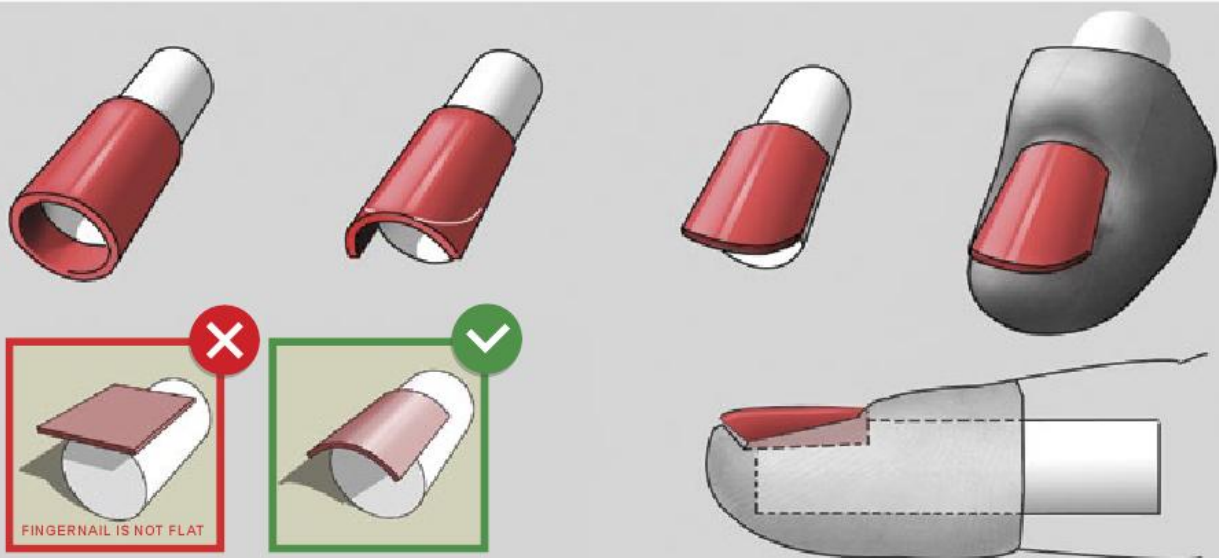


SHAPING HAND AND FINGERS

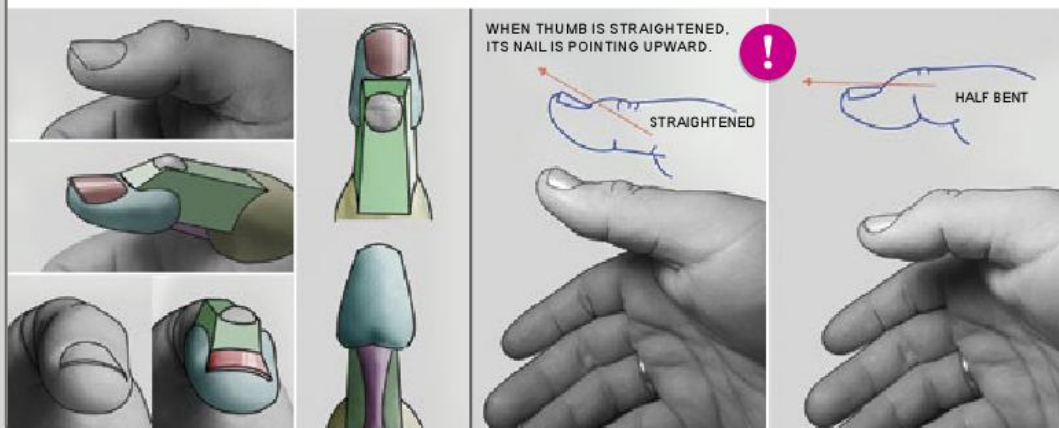
IT IS MUCH EASIER TO BEGIN MODELING FINGERS FROM SIMPLE SQUARE FORMS.



FINGERNAIL

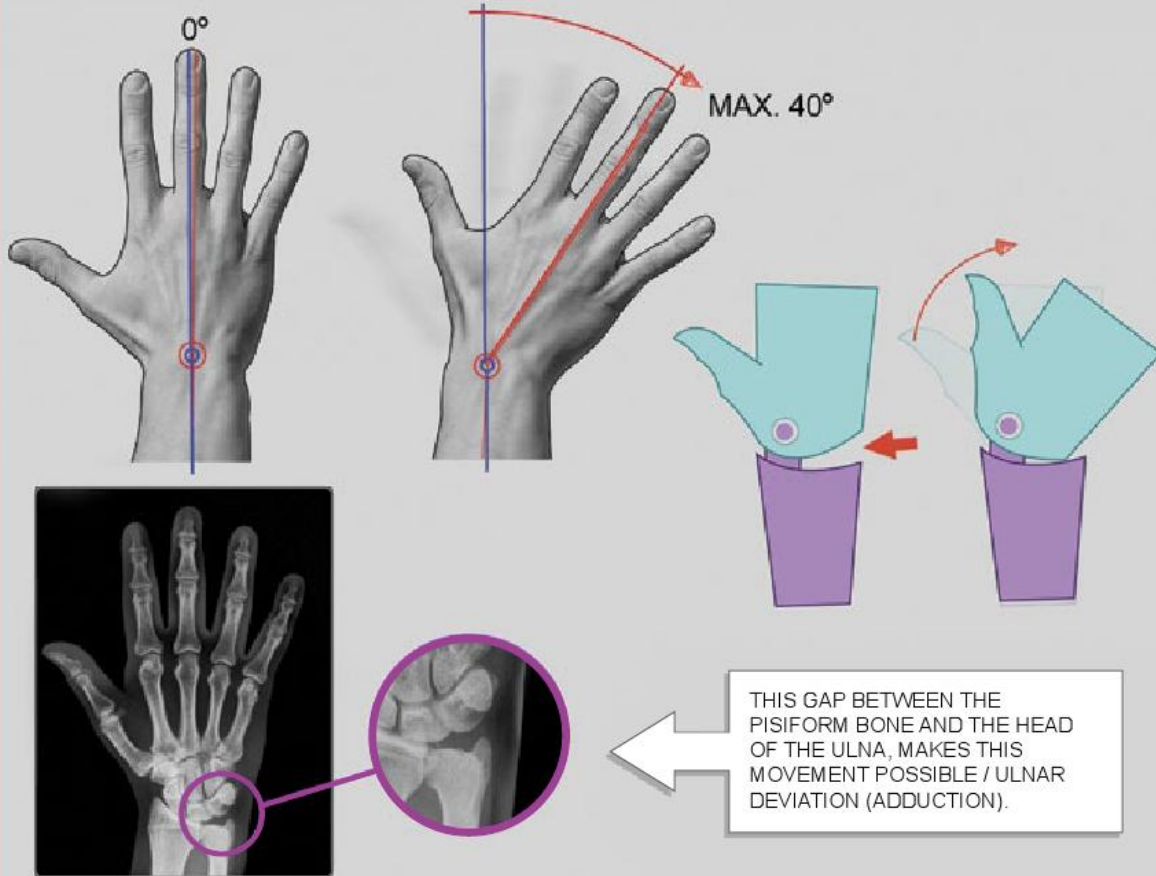


THUMB IS SHAPED DIFFERENTLY THAN OTHER FINGERS.

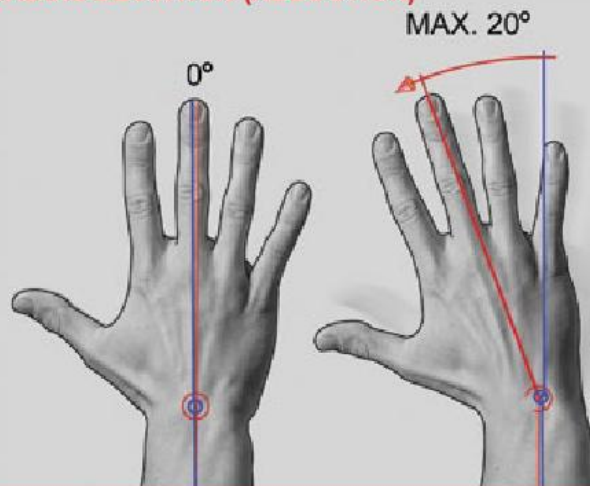


HAND MOVEMENTS

ULNAR DEVIATION (ADDUCTION)

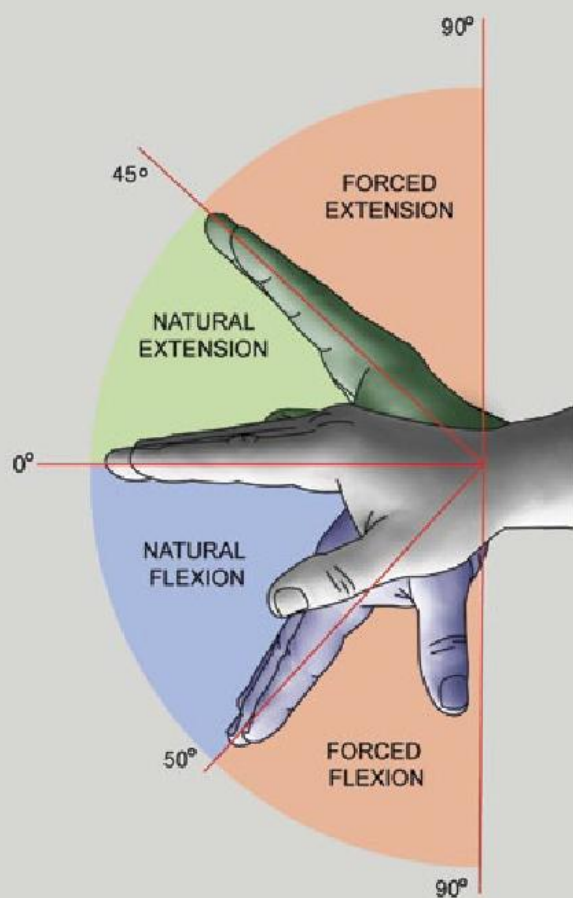
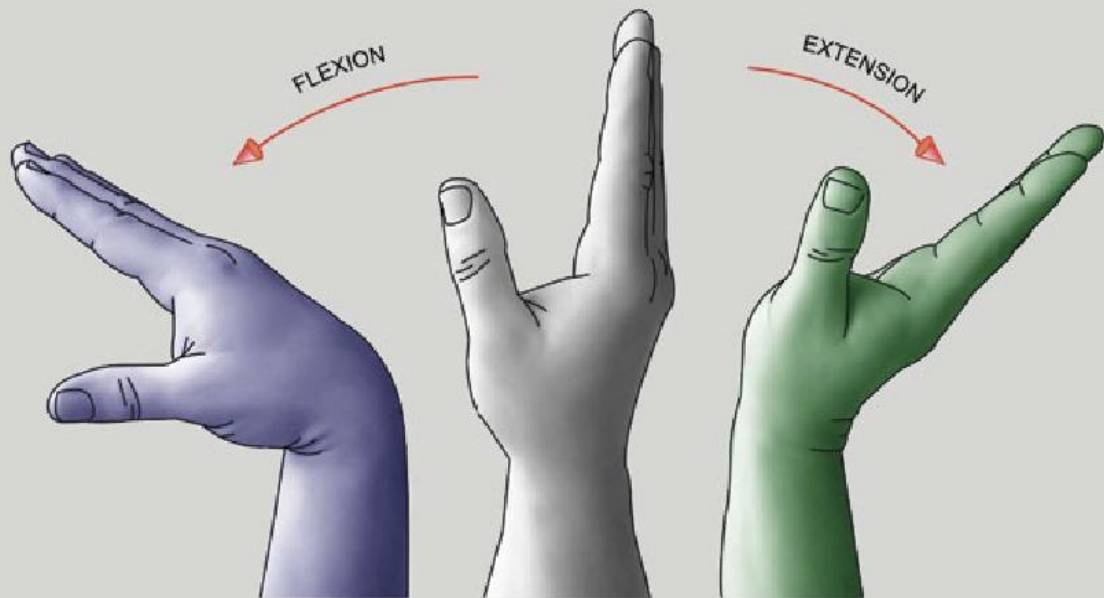


RADIAL DEVIATION (ABDUCTION)



IT'S AN UNNATURAL MOTION: THERE AREN'T ANY MUSCLES DESIGNED SPECIFICALLY TO DO THIS MOVEMENT, SO THE EFFORT COMES FROM THE FLEXOR AND EXTENSOR TENDONS.
WOULD BE BETTER TO AVOID SCULPTING THIS HAND POSITION!

WRIST POSITIONS



EXTENSION



FORCED EXTENSION



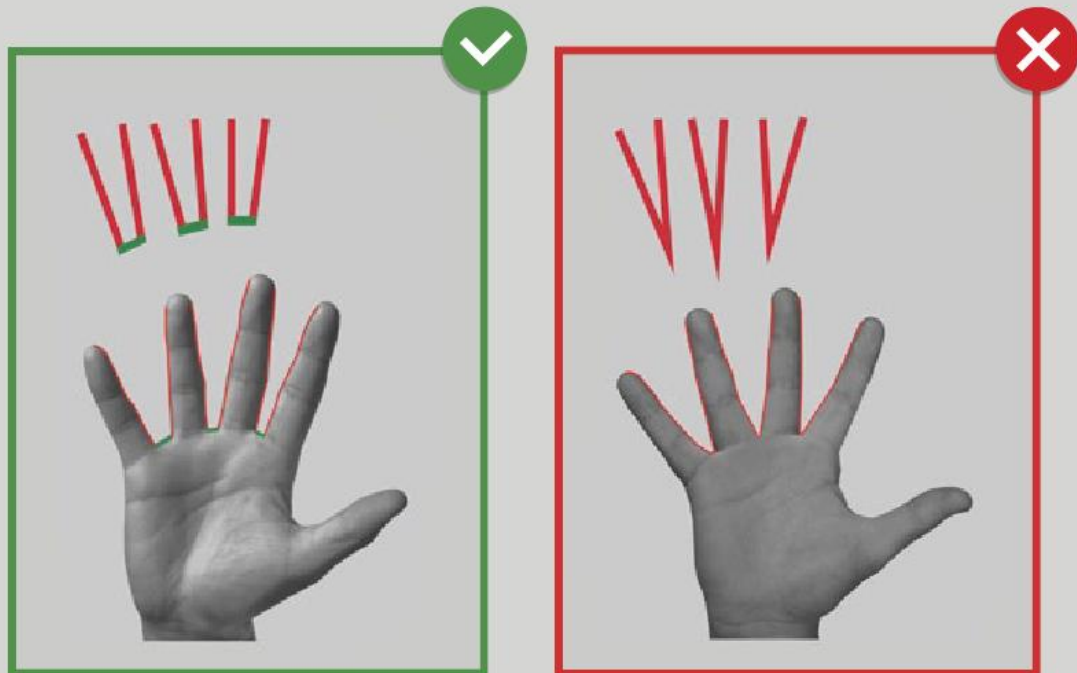
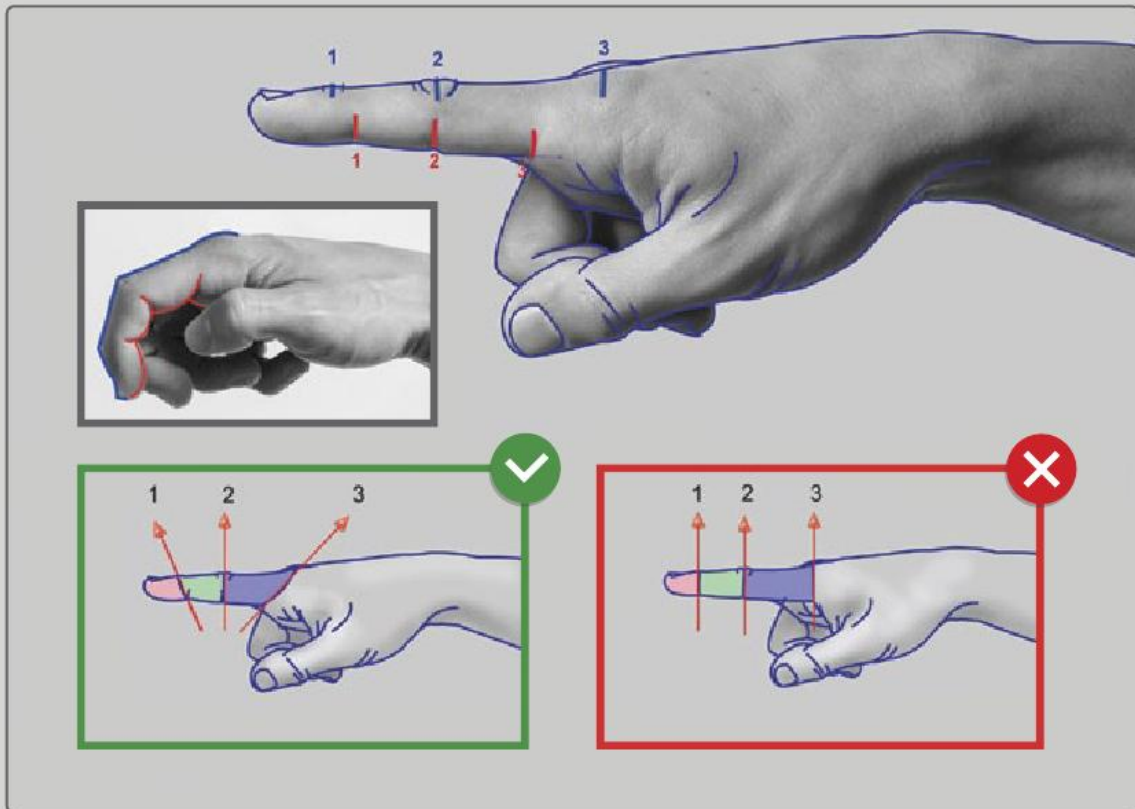
FLEXION



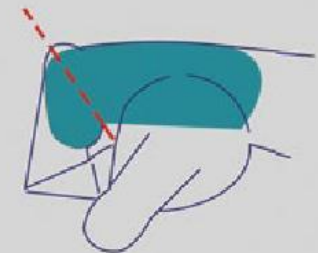
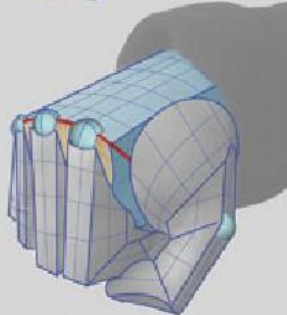
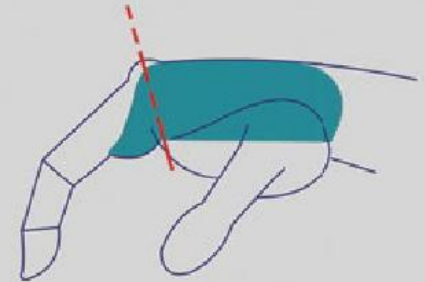
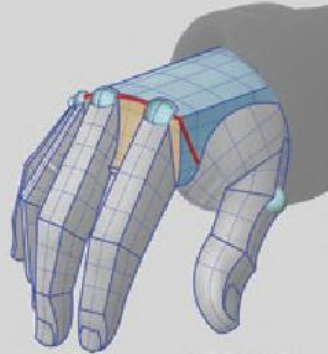
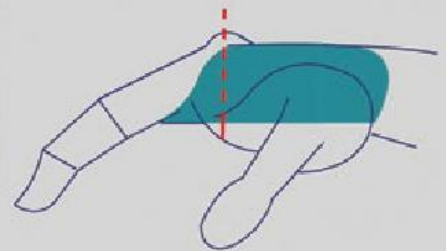
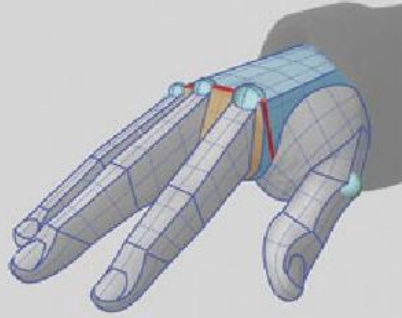
FORCED FLEXION



CREASES AND GAPS OF FINGERS

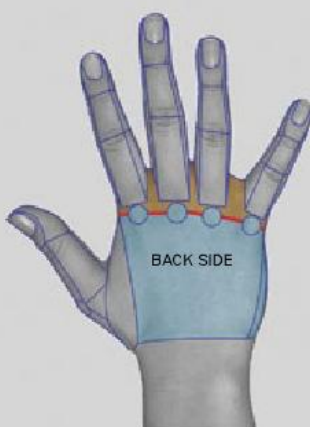


BENDING AND CONNECTION LINE OF FINGERS

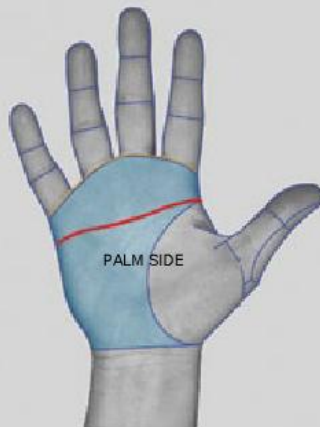


FINGERS ARE SHORTER FROM PALM SIDE OF THE HAND.

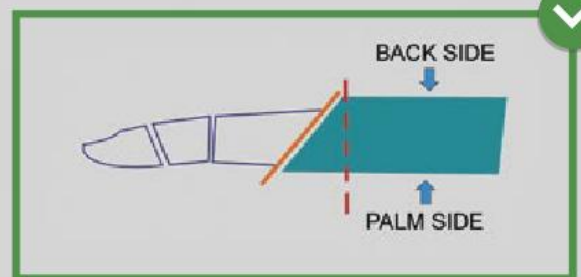
CREASE LINE ON THE PALM DOES NOT MATCH UP WITH **CONNECTION LINE** WHERE FINGERS JOIN **THE BODY OF THE HAND**.



BACK SIDE

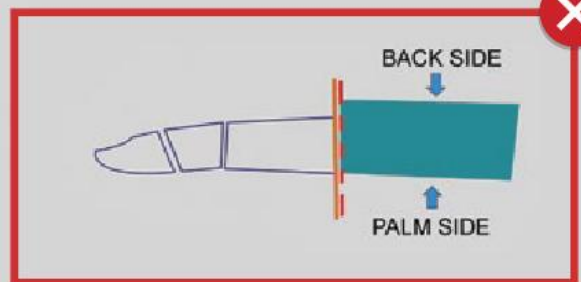


PALM SIDE



BACK SIDE

PALM SIDE



BACK SIDE

PALM SIDE

HOW HANDS AGE



NEWBORN

NEWBORN – HANDS OF A NEWBORN ARE WRINKLED.



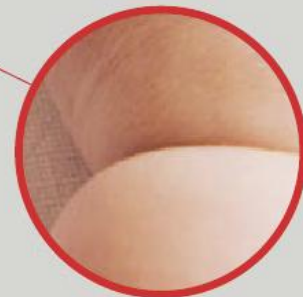
BABY

BABY – SOME OF THE SIGNS THAT A CHILD IS STILL A BABY ARE CHUBBY WRISTS AND KNUCKLE DIMPLES. THE SAME INDENTATIONS ARE ALSO ON THE ELBOWS AND KNEES.



CHILD

CHILD – STILL SOME DIMPLES.



ADULT – LESS FAT.

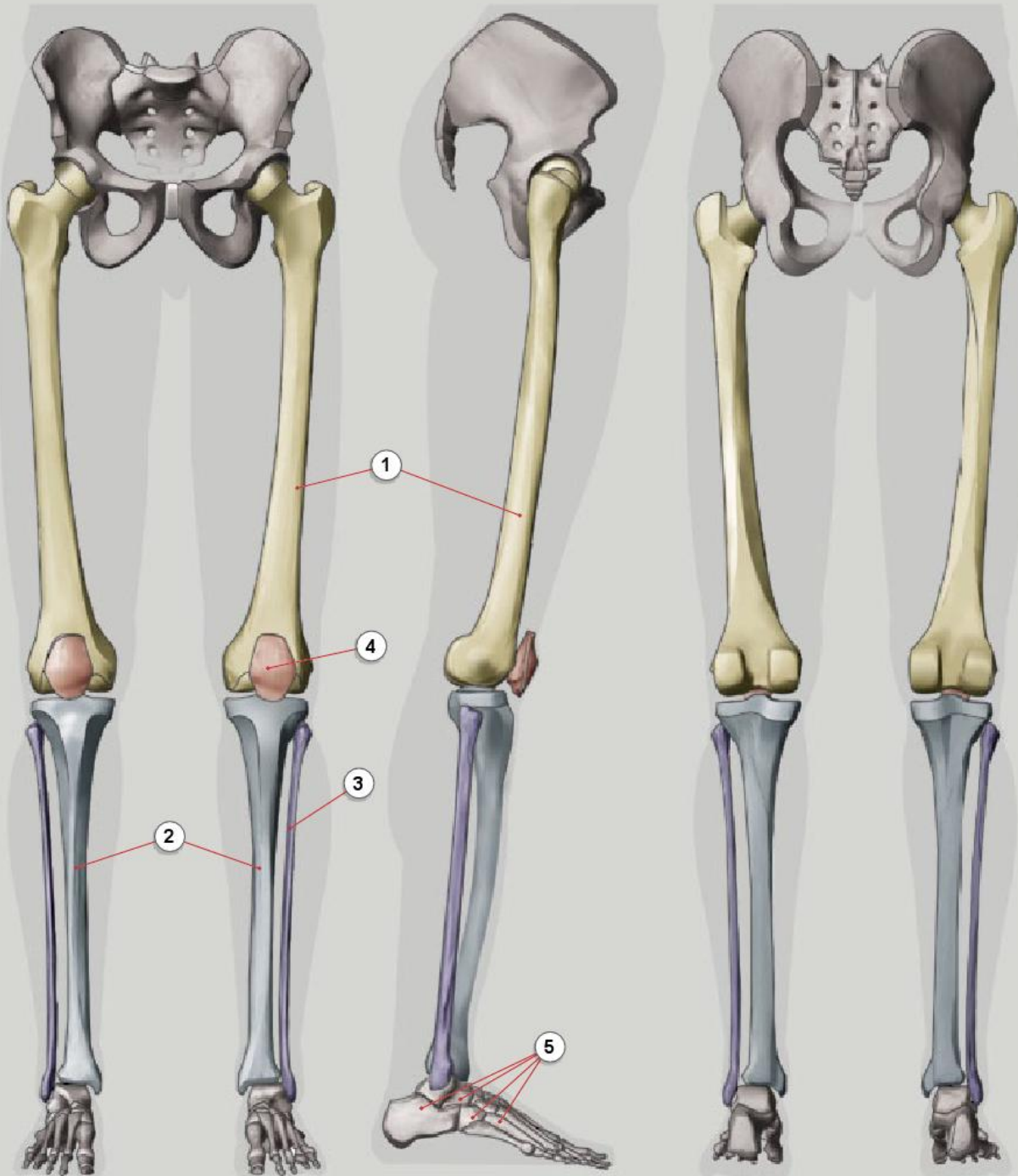
ADULT



SENIOR – ALMOST NO FAT, LOOSE SKIN.

SENIOR

BONES OF LOWER LIMB



1 FEMUR

2 TIBIA

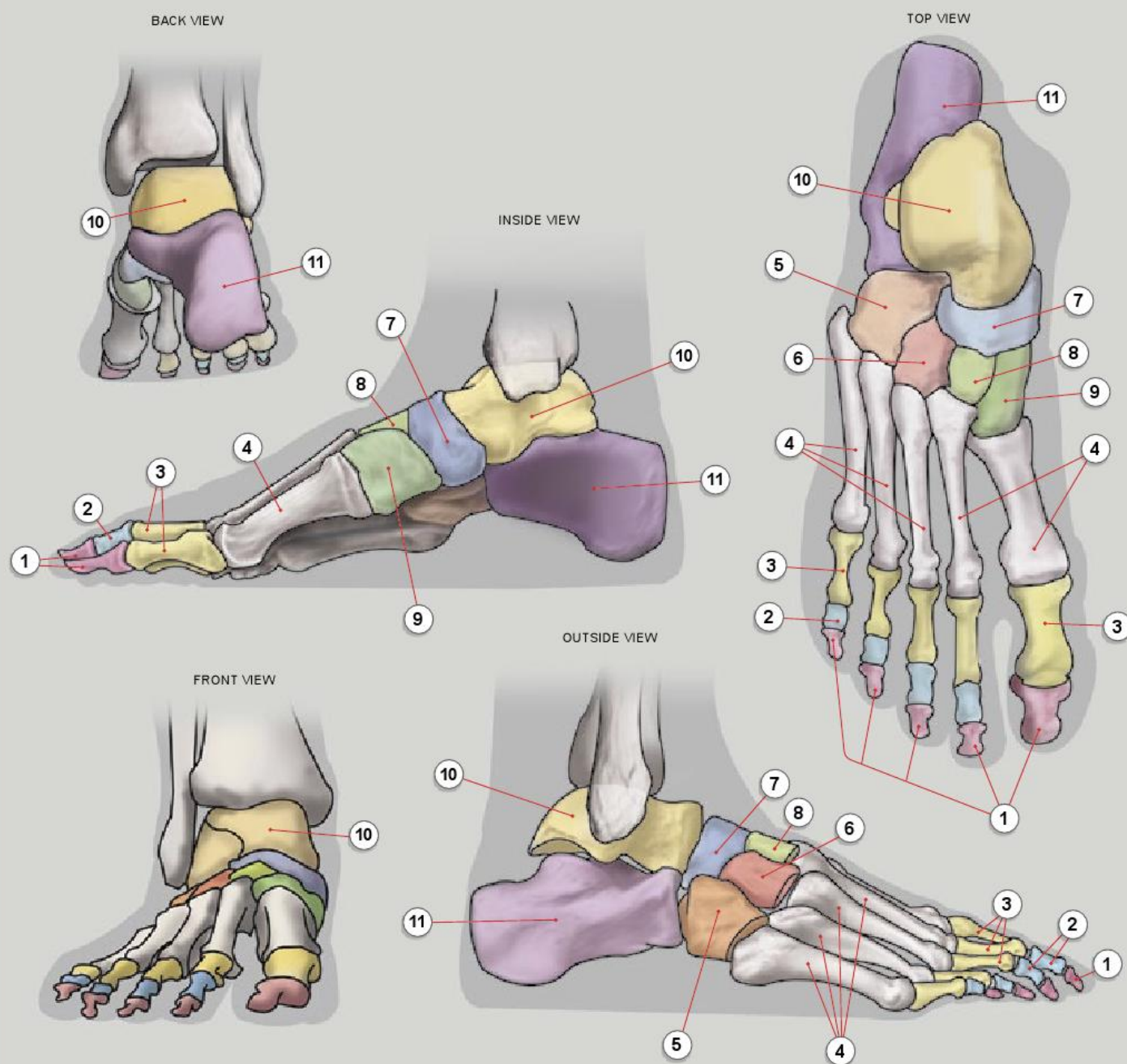
3 FIBULA

4 KNEE CAP (patella)

5 BONES OF THE FOOT

BONES OF THE FOOT

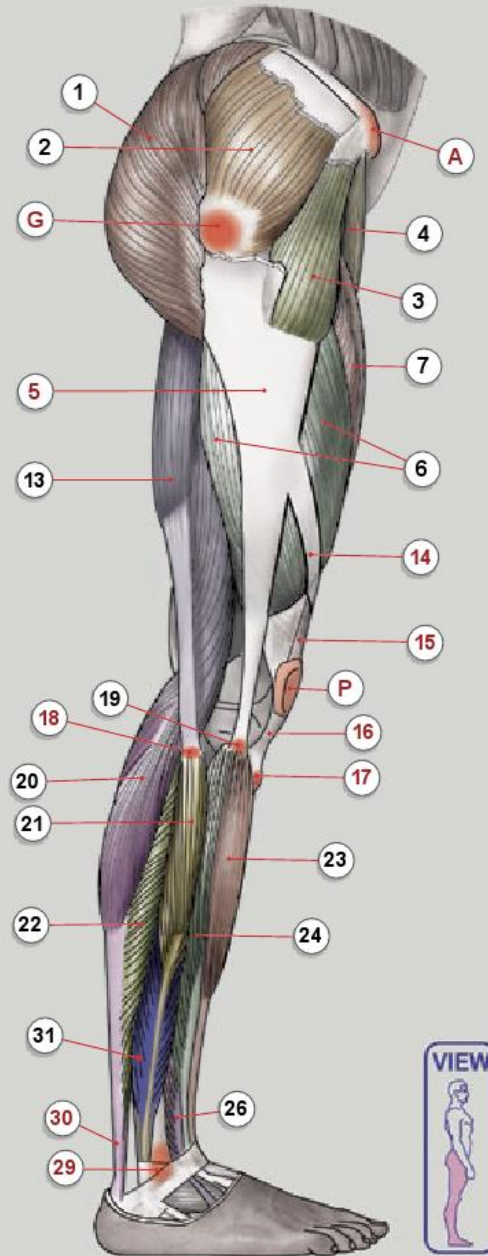
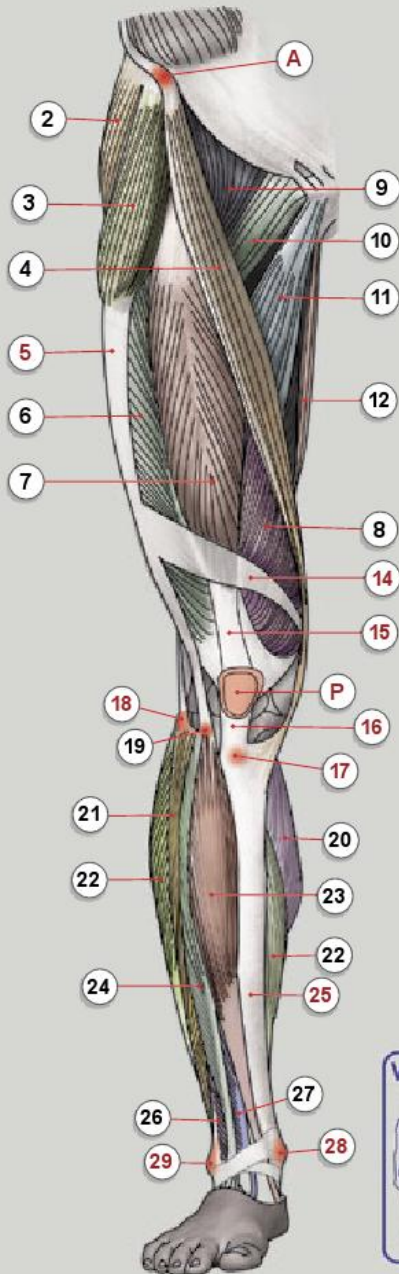
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- | | | |
|----------------------|--------------------------|--------------------------|
| 1 DISTAL PHALANXES | 5 CUBOID | 9 MEDIAL CUNEIFORM |
| 2 MIDDLE PHALANXES | 6 LATERAL CUNEIFORM | 10 TALUS |
| 3 PROXIMAL PHALANXES | 7 NAVICULAR | 11 HEEL BONE (calcaneus) |
| 4 METATARSAL BONES | 8 INTERMEDIATE CUNEIFORM | |

MUSCLES OF LOWER LIMB

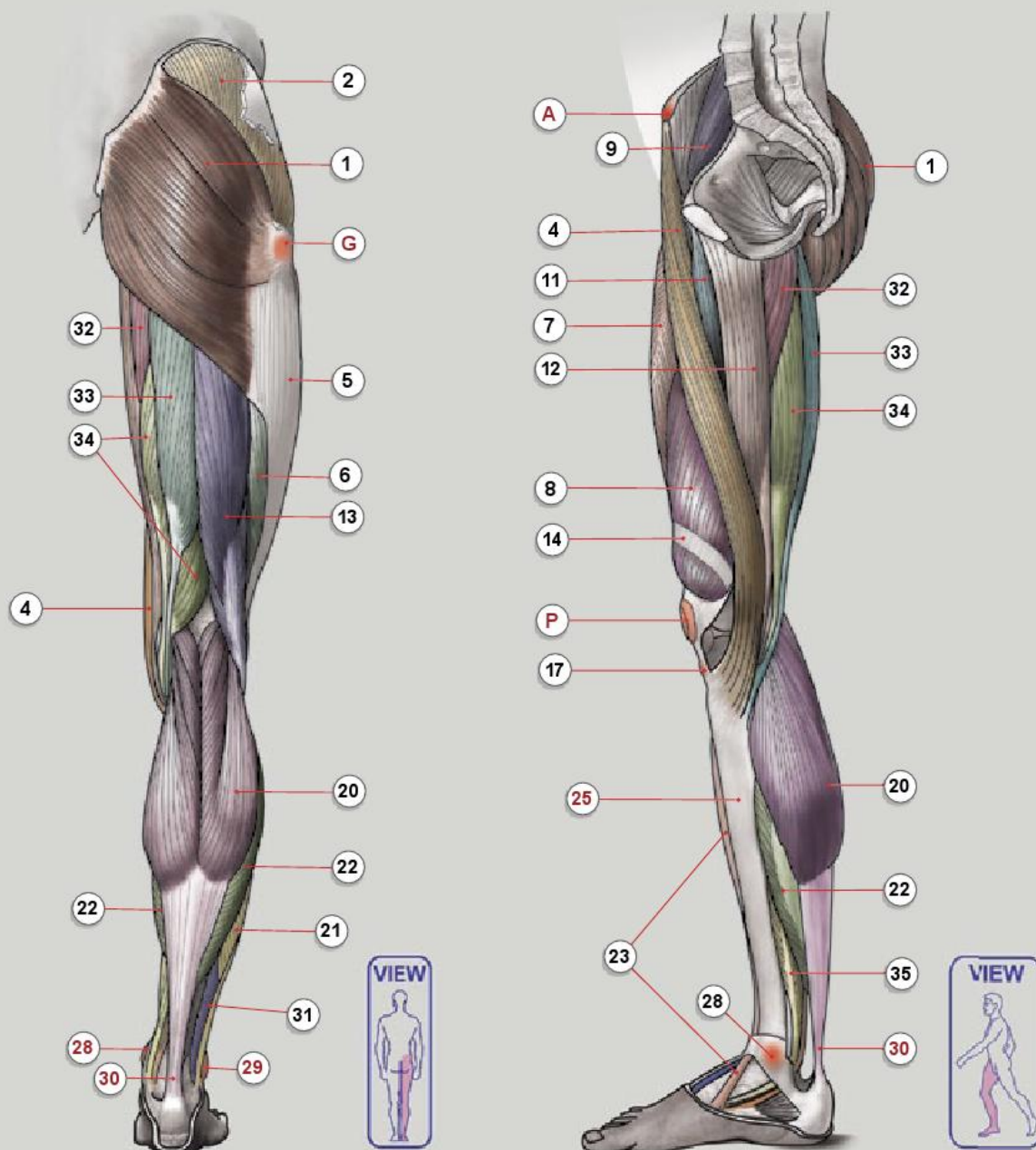
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A A.S.I.S.	5 ILIOTIBIAL BAND	12 GRACILIS
G GREATER TROCHANTER	6 VASTUS LATERALIS	13 BICEPS FEMORIS
P KNEE CAP (PATELLA)	7 RECTUS FEMORIS	14 RICHER'S BAND
1 GLUTEUS MAXIMUS	8 VASTUS MEDIALIS	15 QUADRICEPS TENDON
2 GLUTEUS MEDIUS	9 ILIOPSOAS	16 PATELLAR LIGAMENT
3 TENSOR FASCIAE LATAE	10 PECTINEUS	17 TIBIAL TUBEROSITY
4 SARTORIUS	11 ADDUCTOR LONGUS	18 HEAD OF FIBULA

MUSCLES OF LOWER LIMB

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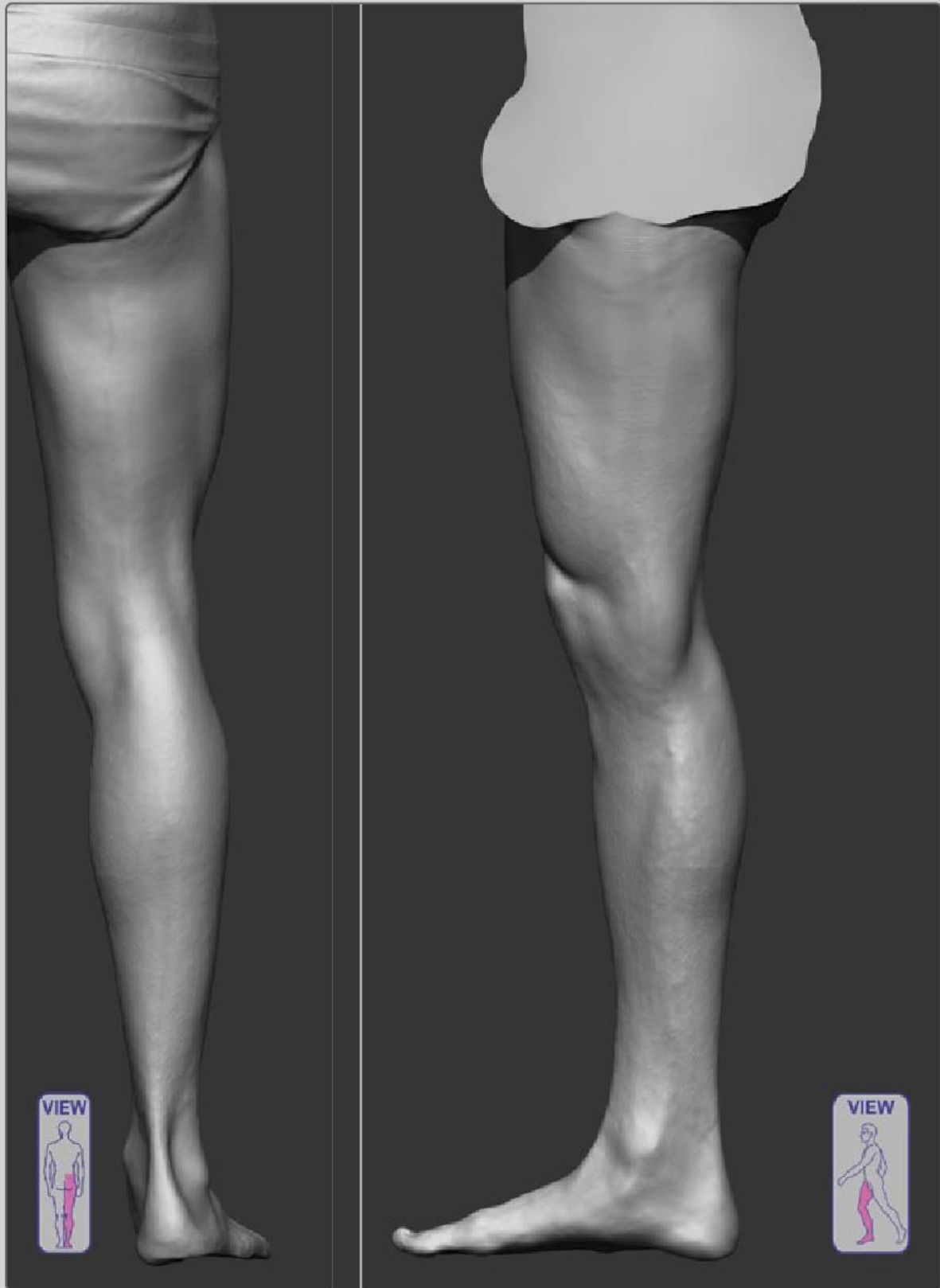


- | | | |
|------------------------------|---------------------------------|----------------------------|
| 19 LATERAL TIBIAL CONDYLE | 25 MEDIAL SURFACE OF TIBIA | 31 PERONEUS BREVIS |
| 20 GASTROCNEMIUS | 26 PERONEUS TERTIUS | 32 ADDUCTOR MAGNUS |
| 21 PERONEUS LONGUS | 27 EXTENSOR HALLUCIS LONGUS | 33 SEMITENDINOSUS |
| 22 SOLEUS | 28 MEDIAL ANKLE (M. MALLEOLUS) | 34 SEMIMEMBRANOSUS |
| 23 TIBIALIS ANTERIOR | 29 LATERAL ANKLE (L. MALLEOLUS) | 35 FLEXOR DIGITORUM LONGUS |
| 24 EXTENSOR DIGITORUM LONGUS | 30 ACHILLES TENDON | |

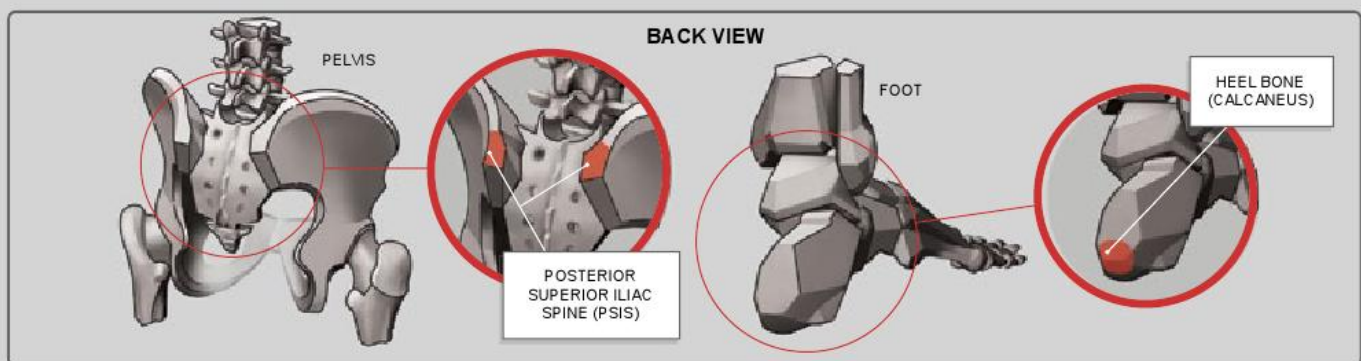
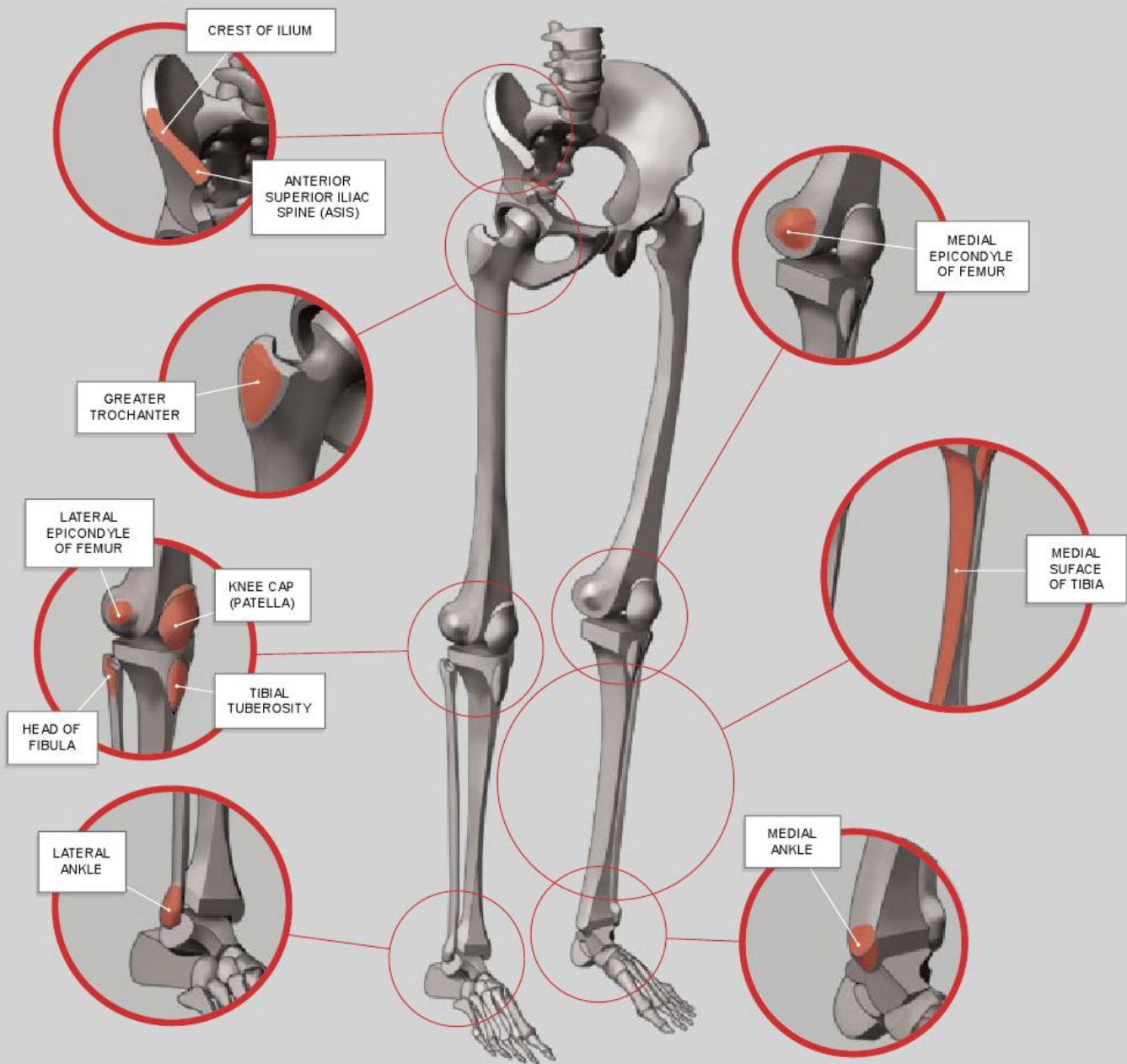
3D SCAN OF RIGHT LEG



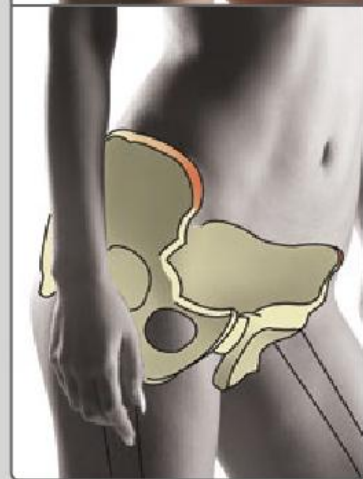
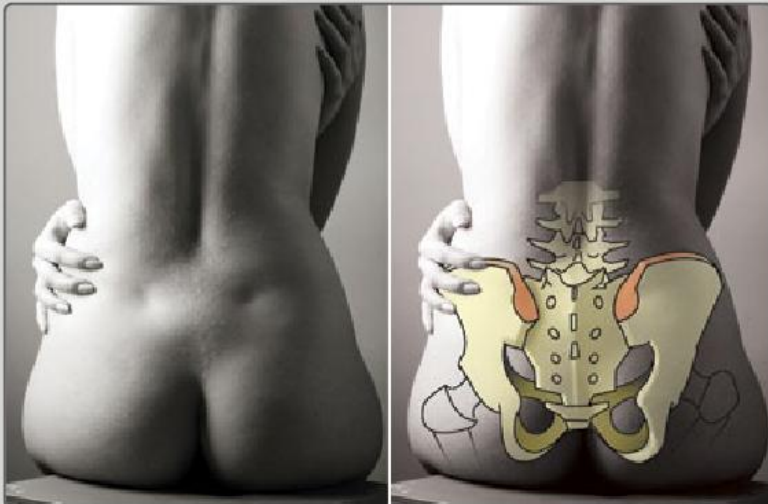
3D SCAN OF RIGHT LEG



BONY LANDMARKS OF LOWER LIMB

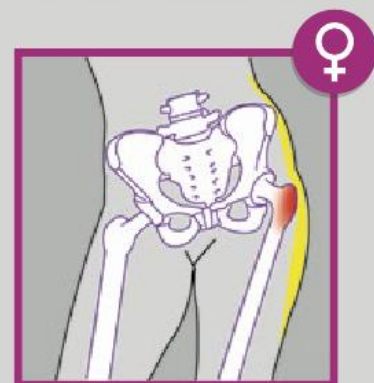
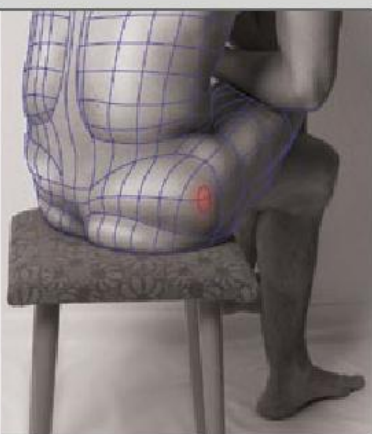
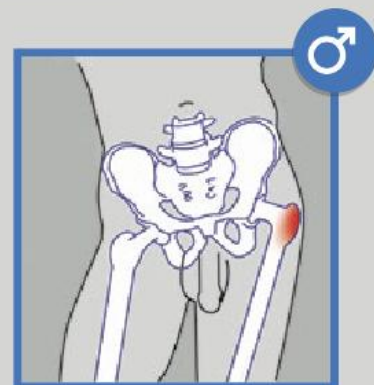


BONY LANDMARKS OF PELVIS



BONY LANDMARKS OF LOWER LIMB

GREATER TROCHANTER



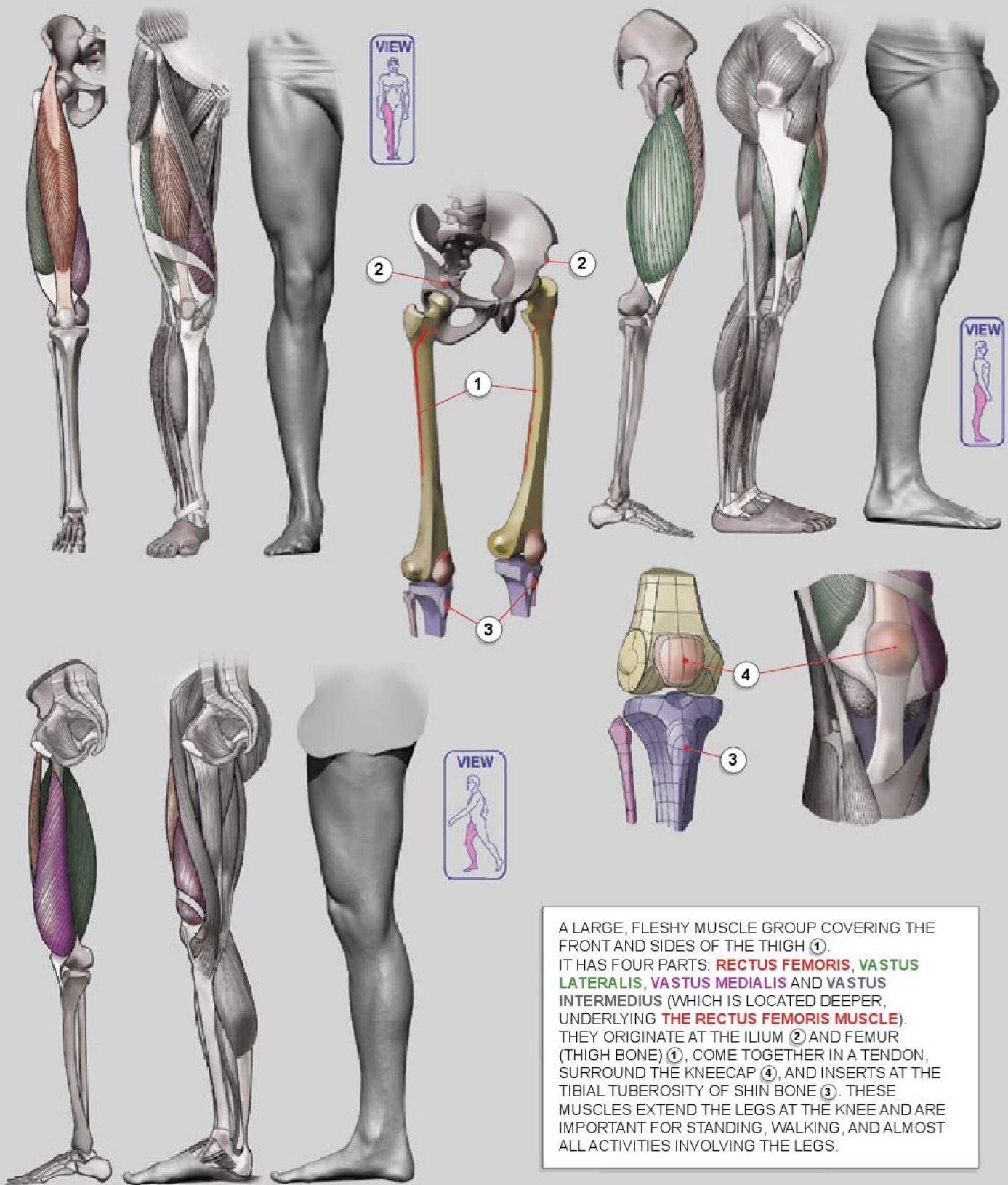
IN FEMALE HIPs, **SUBCUTANEOUS FAT** COVERS **GT** AT THE TOP OF FEMUR AND THEREFORE MAKES IT LESS PROMINENT.

MALE LEG SHAPES



QUADS

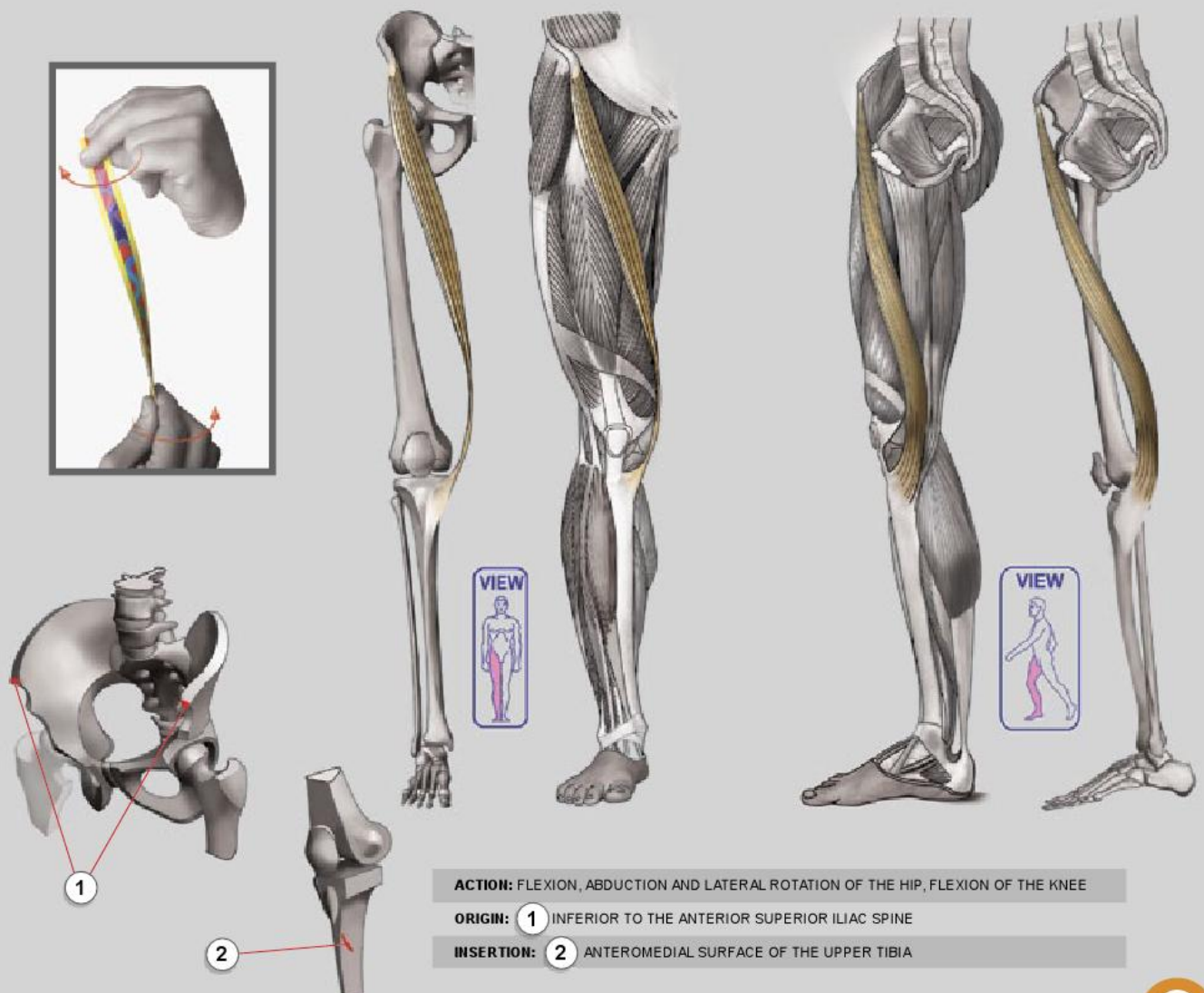
(QUADRICEPS FEMORIS MUSCLE)



A LARGE, FLESHY MUSCLE GROUP COVERING THE FRONT AND SIDES OF THE THIGH ①. IT HAS FOUR PARTS: **RECTUS FEMORIS**, **VASTUS LATERALIS**, **VASTUS MEDIALIS** AND **VASTUS INTERMEDIUS** (WHICH IS LOCATED DEEPER, UNDERLYING **THE RECTUS FEMORIS MUSCLE**). THEY ORIGINATE AT THE ILIUM ② AND FEMUR (THIGH BONE) ①, COME TOGETHER IN A TENDON, SURROUND THE KNEECAP ④, AND INSERTS AT THE TIBIAL TUBEROSITY OF SHIN BONE ③. THESE MUSCLES EXTEND THE LEGS AT THE KNEE AND ARE IMPORTANT FOR STANDING, WALKING, AND ALMOST ALL ACTIVITIES INVOLVING THE LEGS.

SARTORIUS MUSCLE

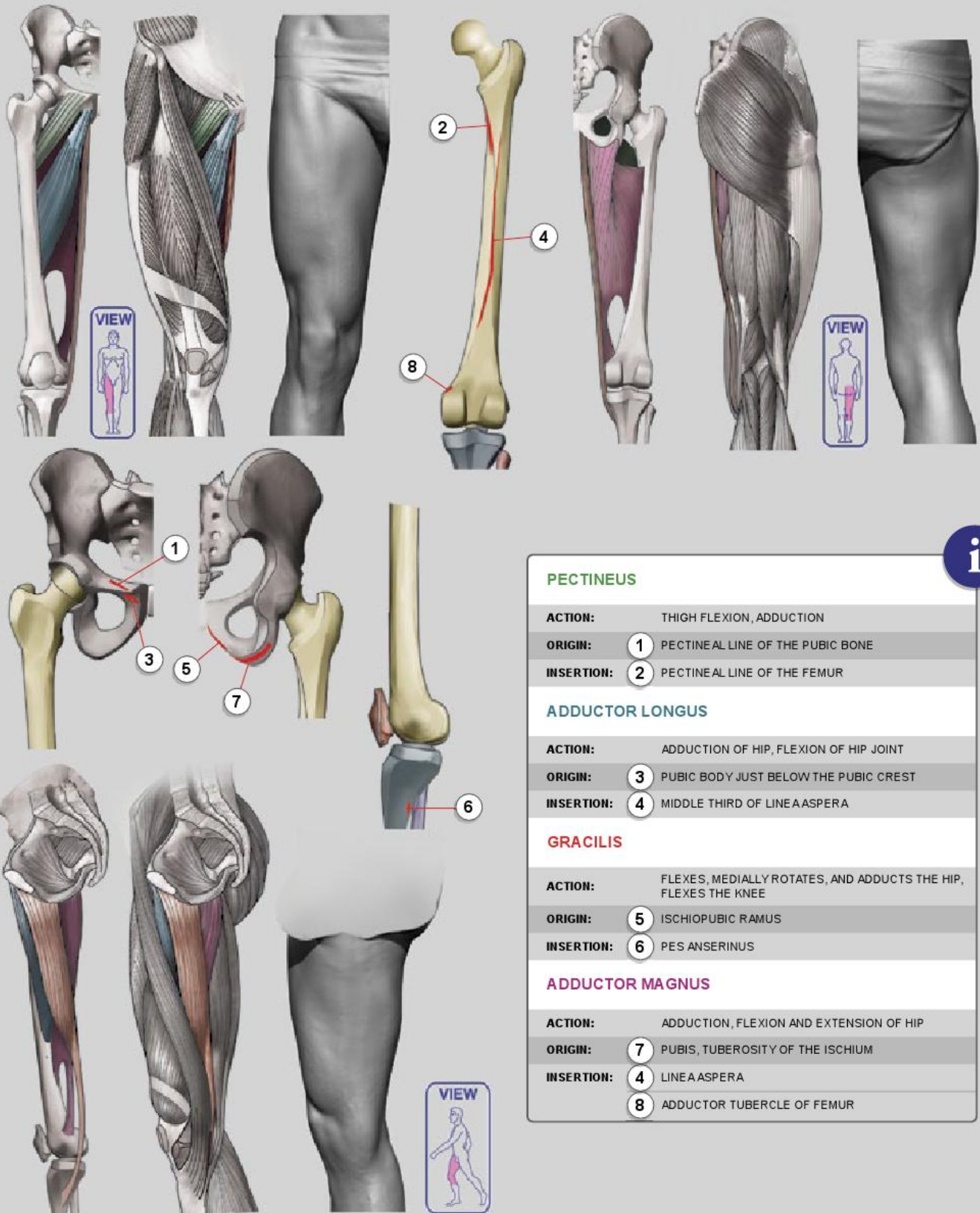
i



SARTORIUS MUSCLE DIVIDES THIGH INTO TWO PLANES



PECTINEUS, ADDUCTOR LONGUS, GRACILIS, AND ADDUCTOR MAGNUS (ADDUCTOR MUSCLES OF THE HIP)



PECTINEUS

ACTION:	THIGH FLEXION, ADDUCTION
ORIGIN:	1 PECTINEAL LINE OF THE PUBIC BONE
INSERTION:	2 PECTINEAL LINE OF THE FEMUR

ADDUCTOR LONGUS

ACTION:	ADDUCTION OF HIP, FLEXION OF HIP JOINT
ORIGIN:	3 PUBIC BODY JUST BELOW THE PUBIC CREST
INSERTION:	4 MIDDLE THIRD OF LINEA ASPERA

GRACILIS

ACTION:	FLEXES, MEDIANLY ROTATES, AND ADDUCTS THE HIP, FLEXES THE KNEE
ORIGIN:	5 ISCHIO-PUBIC RAMUS
INSERTION:	6 PES ANSERINUS

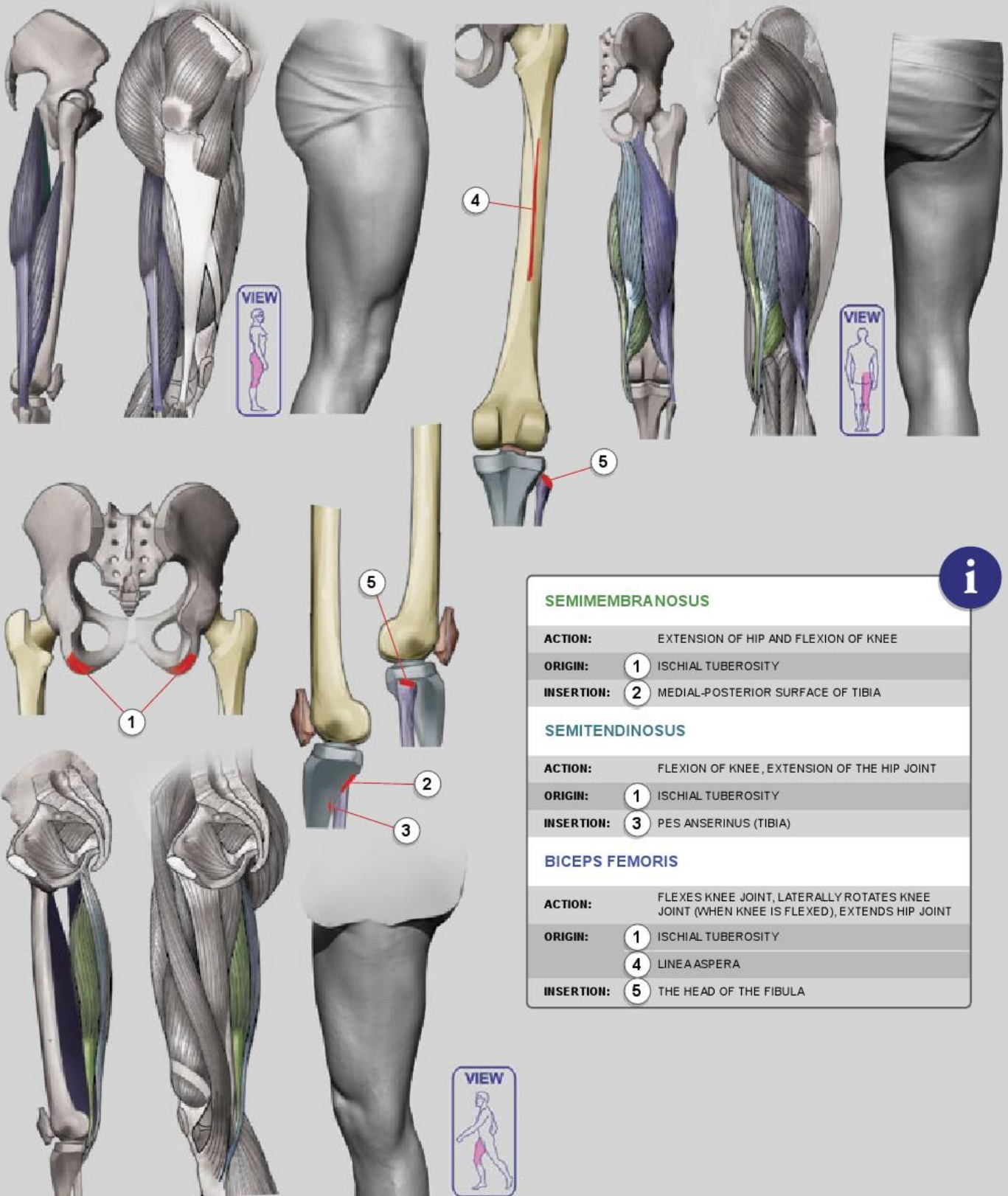
ADDUCTOR MAGNUS

ACTION:	ADDUCTION, FLEXION AND EXTENSION OF HIP
ORIGIN:	7 PUBIS, TUBEROSITY OF THE ISCHIUM
INSERTION:	4 LINEA ASPERA 8 ADDUCTOR TUBERCLE OF FEMUR

HAMSTRINGS

(FLEXORS OF THE THIGH)

SEMITENDINOSUS, SEMIMEMBRANOSUS AND BICEPS FEMORIS MUSCLES



SEMIMEMBRANOSUS

ACTION: EXTENSION OF HIP AND FLEXION OF KNEE

ORIGIN: ① ISCHIAL TUBEROSITY

INSERTION: ② MEDIAL-POSTERIOR SURFACE OF TIBIA

SEMITENDINOSUS

ACTION: FLEXION OF KNEE, EXTENSION OF THE HIP JOINT

ORIGIN: ① ISCHIAL TUBEROSITY

INSERTION: ③ PES ANSERINUS (TIBIA)

BICEPS FEMORIS

ACTION: FLEXES KNEE JOINT, LATERALLY ROTATES KNEE JOINT (WHEN KNEE IS FLEXED), EXTENDS HIP JOINT

ORIGIN: ① ISCHIAL TUBEROSITY

④ LINEA ASPERA

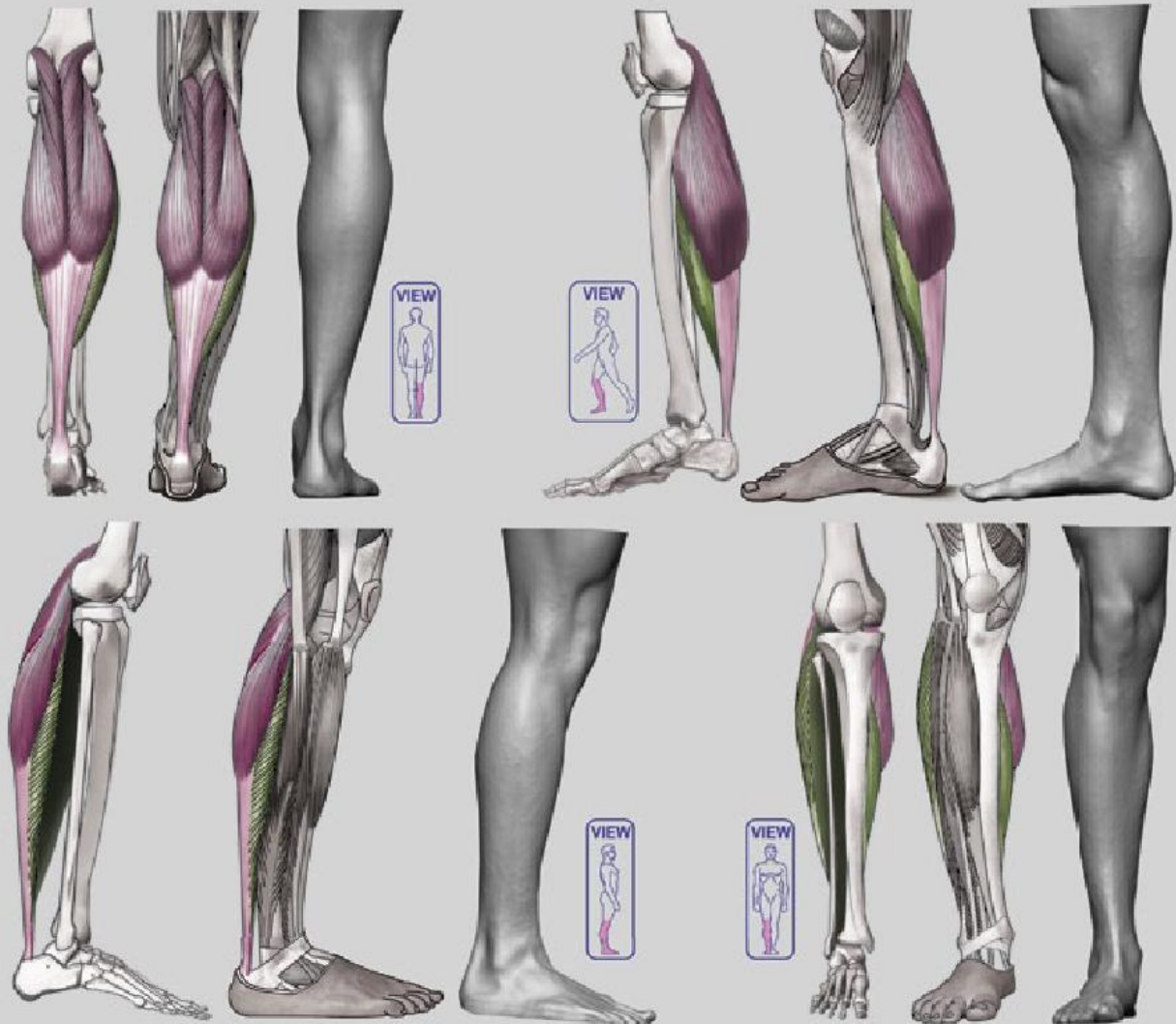
INSERTION: ⑤ THE HEAD OF THE FIBULA

CALVES



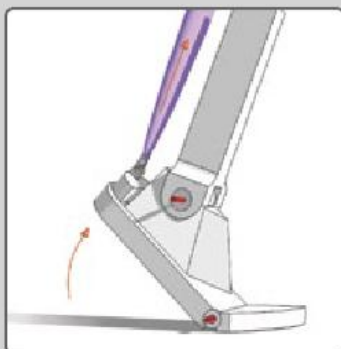
THE CALF

(GASTROCNEMIUS AND SOLEUS MUSCLES)

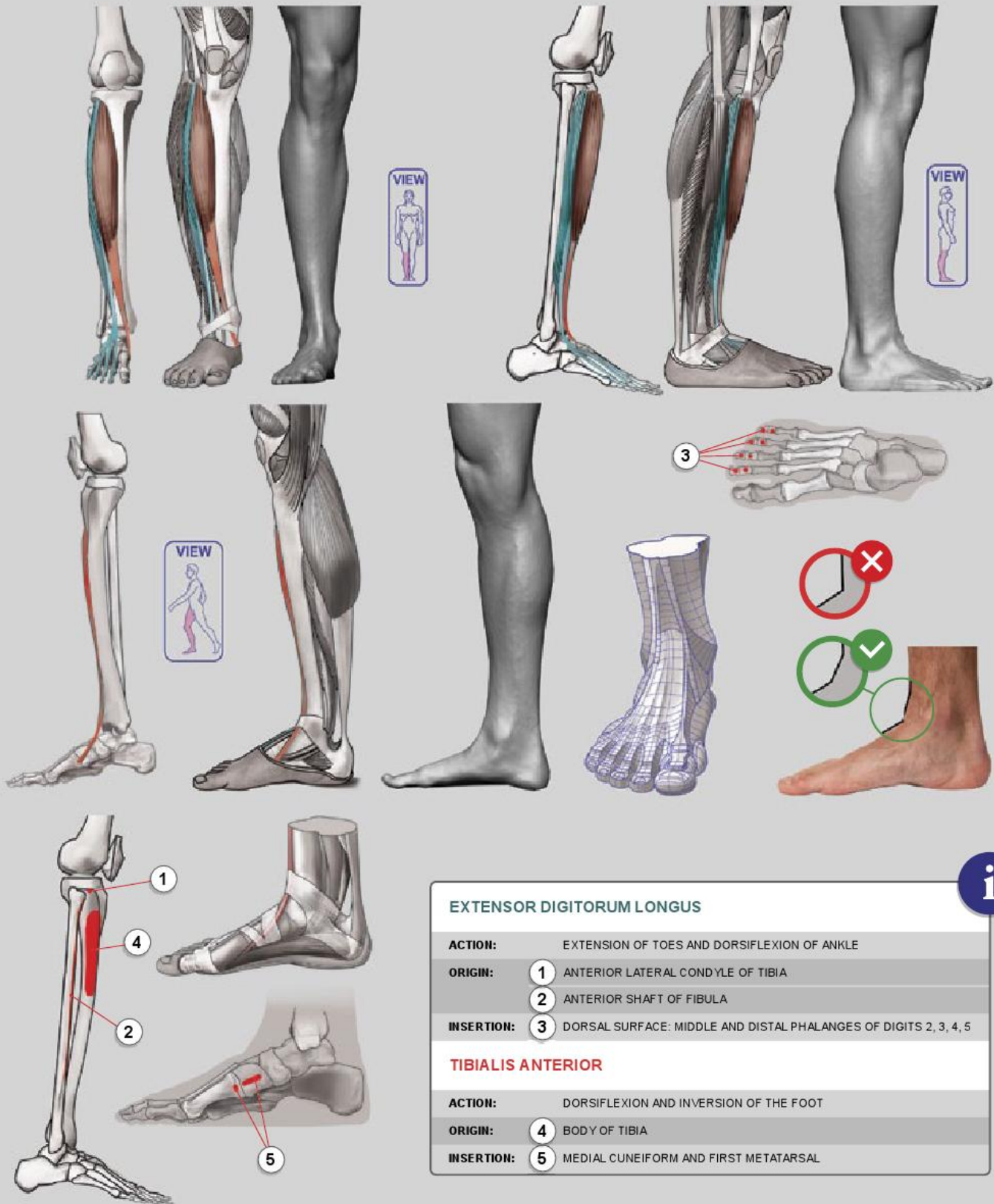


GASTROCNEMIUS MUSCLE IS THE LARGER CALF MUSCLE, FORMING A BULGE VISIBLE BENEATH THE SKIN. **THE GASTROCNEMIUS** HAS TWO PARTS OR "HEADS", WHICH TOGETHER CREATE ITS DIAMOND SHAPE. **THE SOLEUS** IS A SMALLER, FLAT MUSCLE THAT LIES UNDERNEATH THE **GASTROCNEMIUS** MUSCLE. CONNECTIVE TISSUE AT THE BOTTOM OF THE CALF MUSCLE MERGES WITH THE ACHILLES TENDON. THE ACHILLES TENDON INSERTS INTO THE HEEL BONE (CALCANEUS).

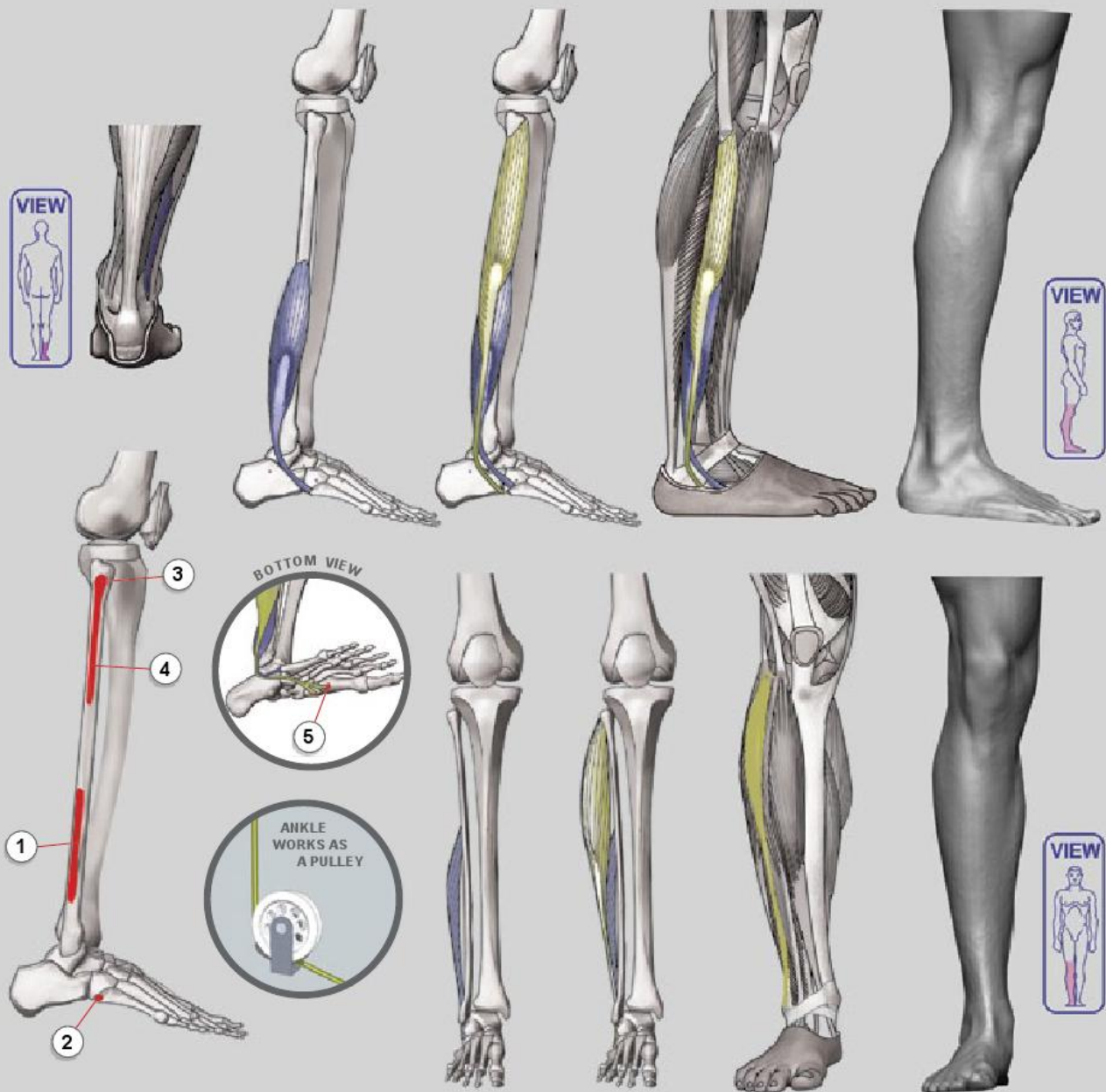
i



EXTENSOR DIGITORUM LONGUS AND **TIBIALIS ANTERIOR** MUSCLES



PERONEUS BREVIS AND PERONEUS LONGUS MUSCLES



PERONEUS BREVIS

ACTIONS: EVERTS AND PLANTAR FLEXES THE FOOT

ORIGIN: ① LOWER 2/3 OF THE LATERAL FIBULA

INSERTION: ② ENLARGED BASE OF THE 5TH METATARSAL

PERONEUS LONGUS

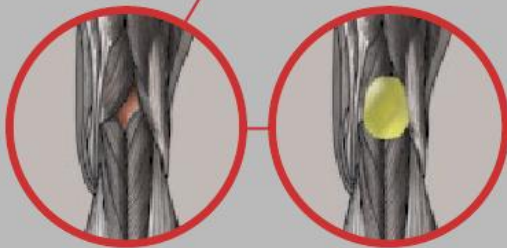
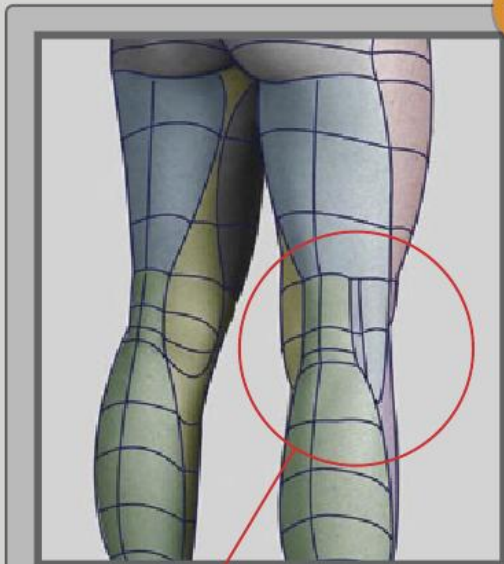
ACTIONS: EVERTS AND PLANTAR FLEXES THE FOOT, MAINTAINS THE ARCH OF THE FOOT

ORIGIN: ③ HEAD OF FIBULA

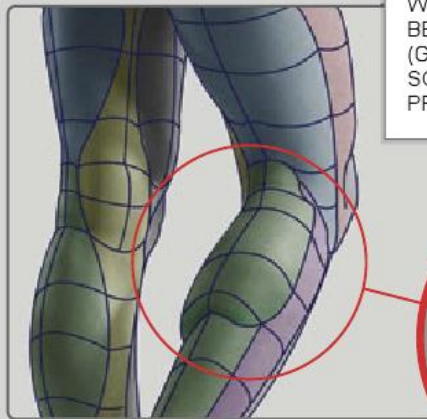
④ UPPER 2/3 OF THE SHAFT OF FIBULA

INSERTION: ⑤ UNDER THE FOOT INTO THE BASE OF THE 1st. METATARSAL BONE, AND MEDIAL CUNEIFORM

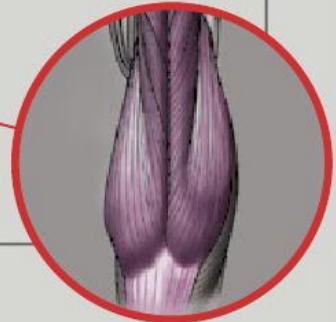
TIPS FOR BACKSIDE OF LEGS



HERE, IN THE MUSCLE VIEW, THE BACK OF THE KNEE IS A SHALLOW DEPRESSION. BUT IN REAL LIFE, WHEN THE LEG IS STRAIGHT, THIS AREA POPS OUTWARD. THIS IS BECAUSE OF A FAT PAD LOCATED RIGHT ON TOP OF THE POPLITEAL FOSSA.



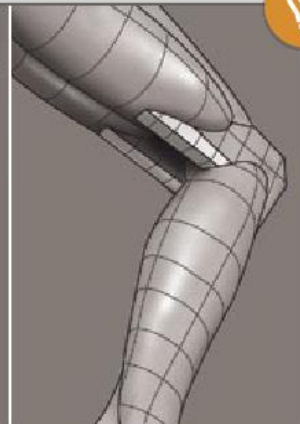
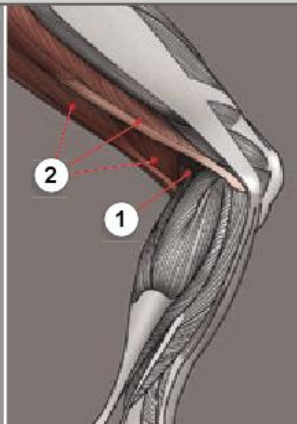
WHEN THE LEG IS BENT, CALF MUSCLES (GASTROCNEMIUS AND SOLEUS) ARE MORE PRONOUNCED!

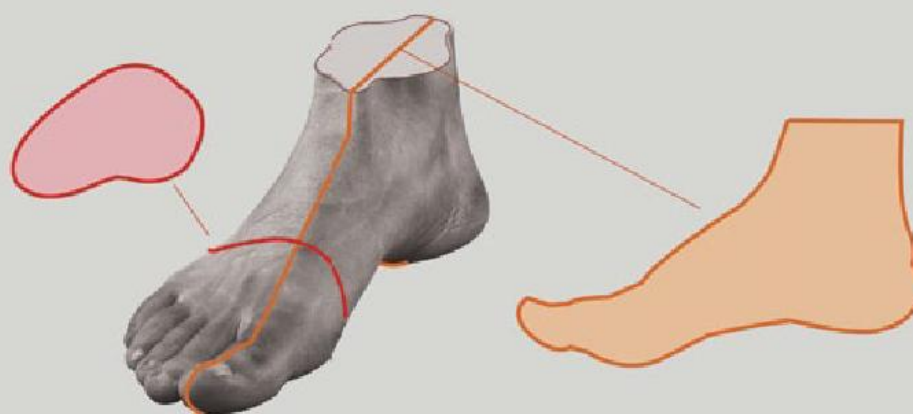


AS THE LEG IS BENT FURTHER, THE DEPRESSION, CALLED THE POPLITEAL FOSSA (THE KNEE PIT), BECOMES DEEPER.

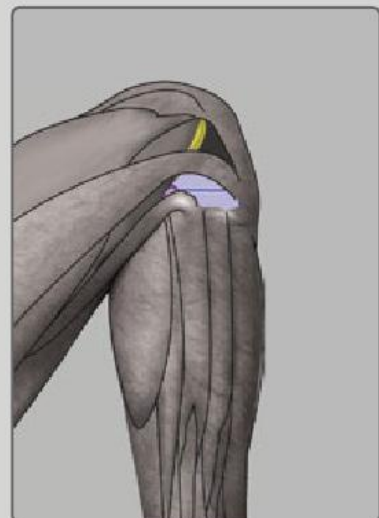
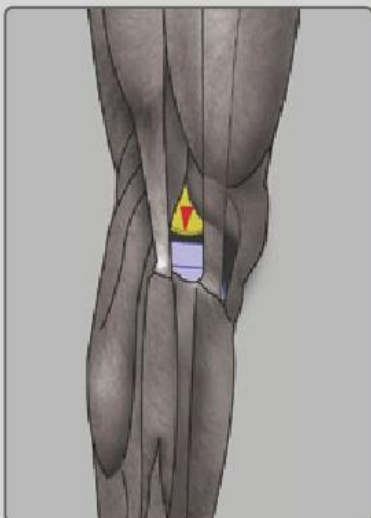
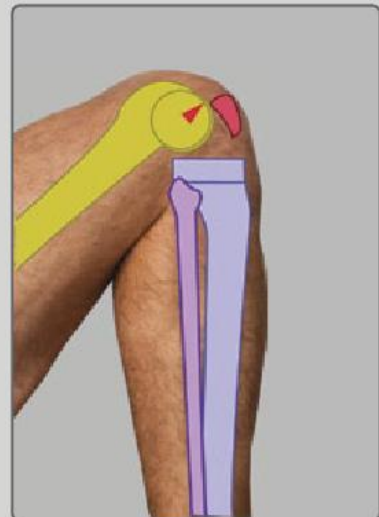
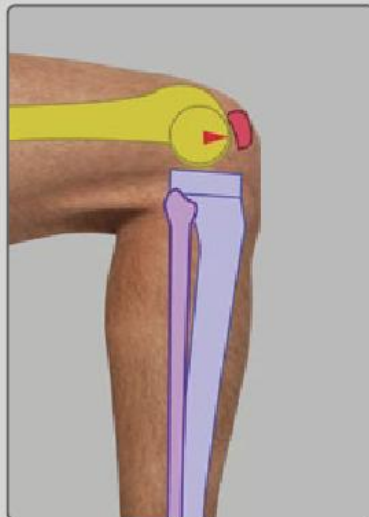
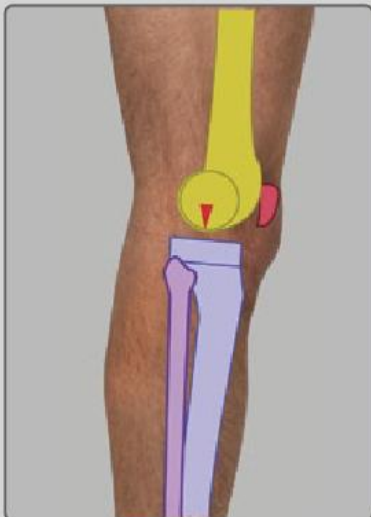
1 FOSSA (THE KNEE PIT) BECOMES PROMINENT

2 **HAMSTRING MUSCLES**

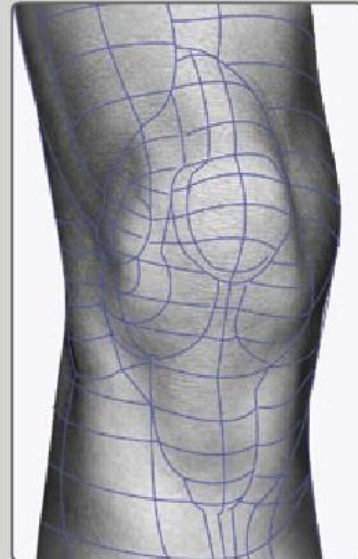
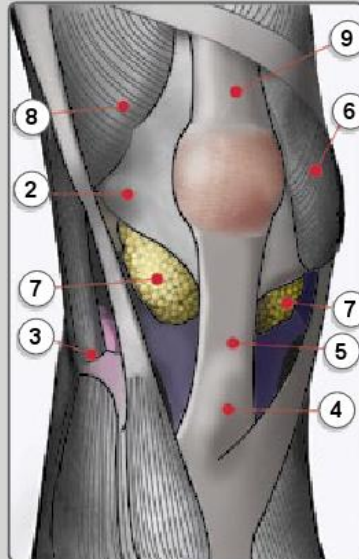
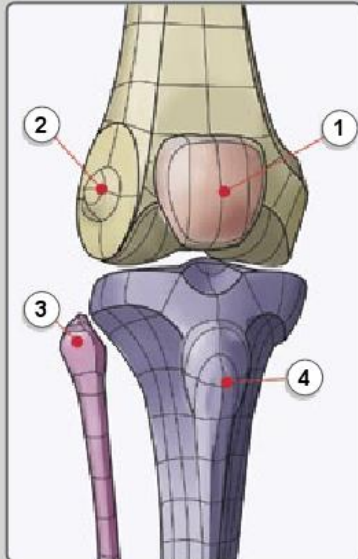




KNEE MECHANICS



THE KNEE (WHAT ARE THESE BUMPS?)



1 KNEE CAP (PATELLA)

2 LATERAL EPICONDYLE OF FEMUR

3 HEAD OF FIBULA

4 TIBIAL TUBEROSITY

5 PATELLAR LIGAMENT

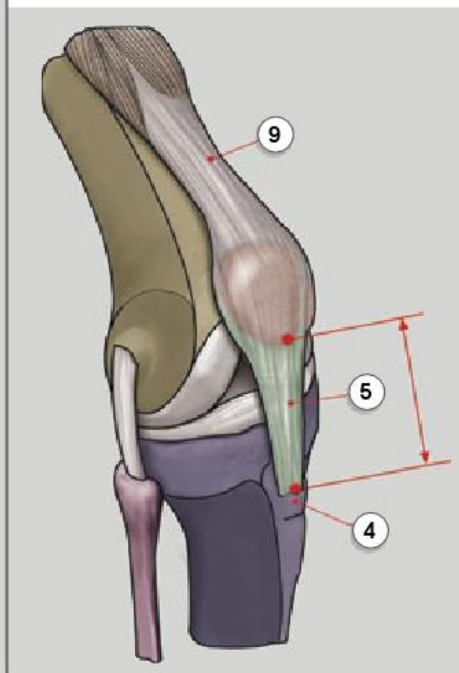
6 VASTUS MEDIALIS

7 INFRAPATELLAR FAT PAD

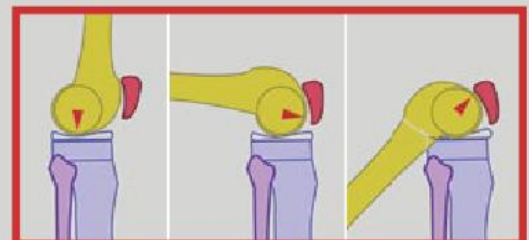
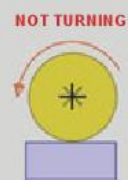
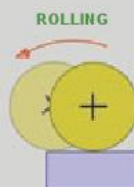
8 VASTUS LATERALIS

9 QUADRICEPS TENDON

PATELLAR LIGAMENT 5 DO NOT STRETCH LIKE TENDONS 9 SO THE DISTANCE BETWEEN KNEE CAP AND TIBIAL TUBEROSITY 4 REMAINS CONSISTENT.

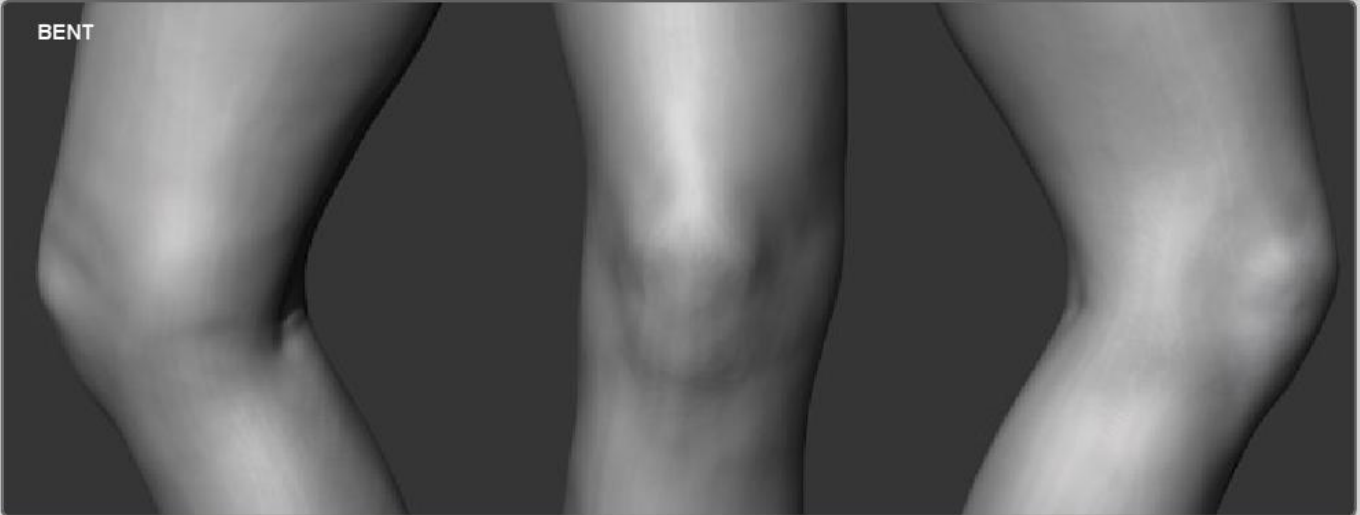


THE HEAD OF THE **FEMUR** IS **ROLLING** OVER THE TOP OF THE **TIBIA**, **NOT TURNING**.



3D SCAN OF RIGHT KNEE

BENT

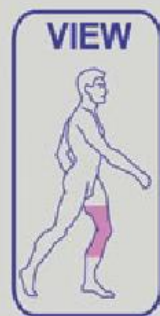
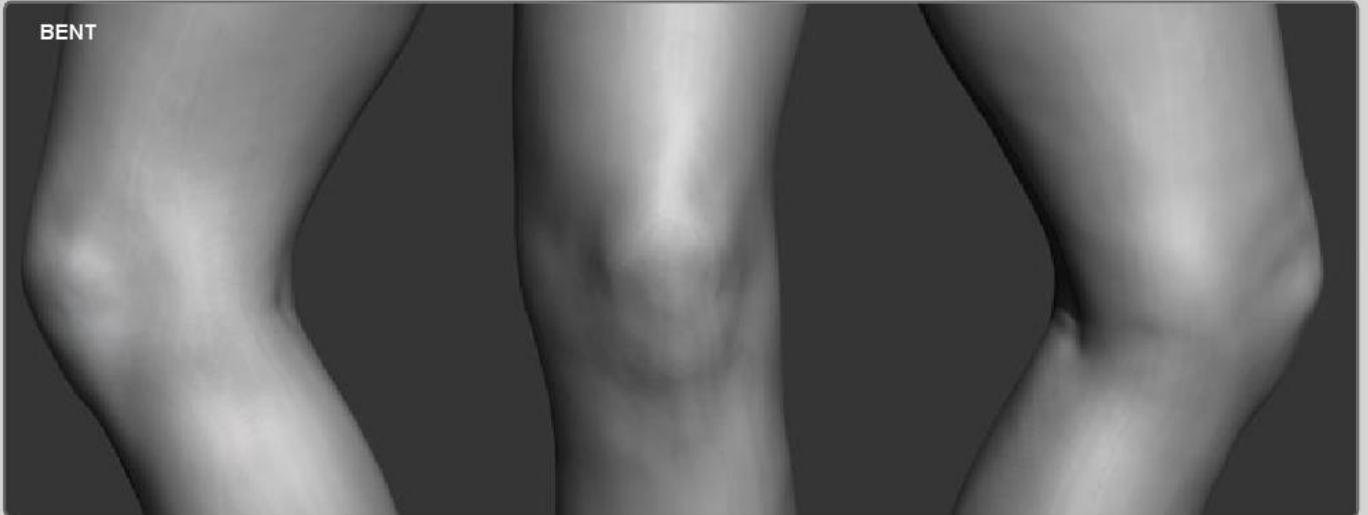


STRAIGHTENED



3D SCAN OF LEFT KNEE

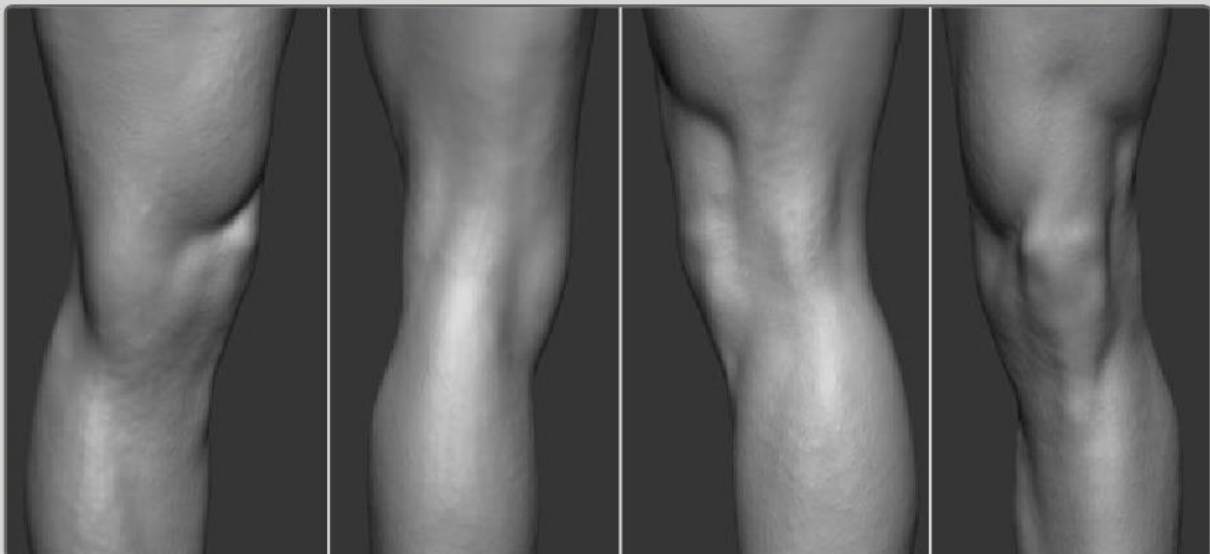
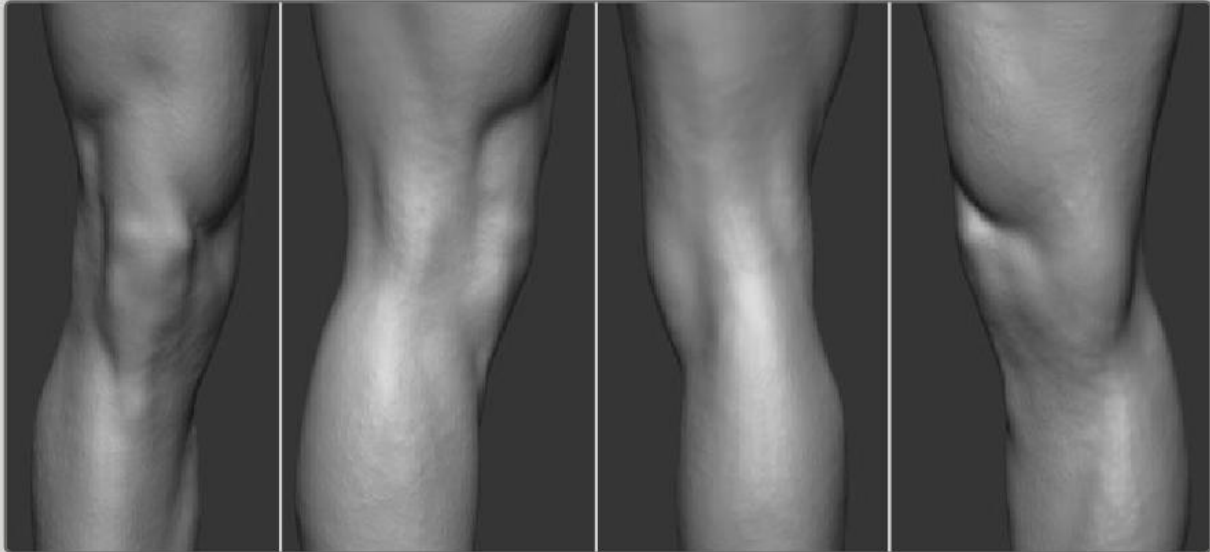
BENT



STRAIGHTENED



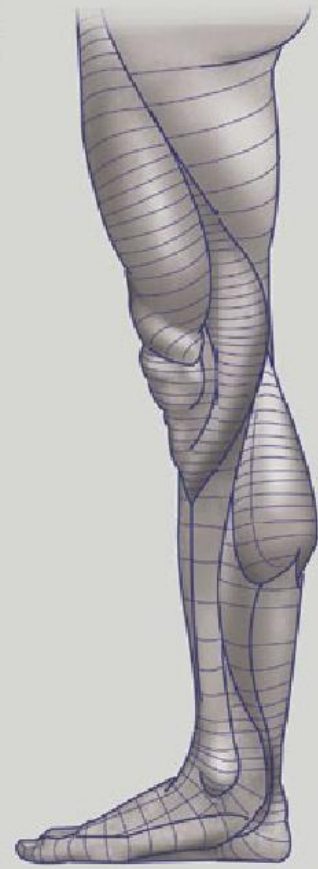
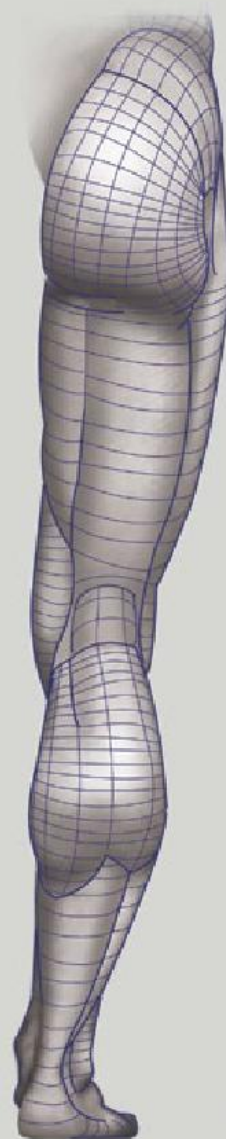
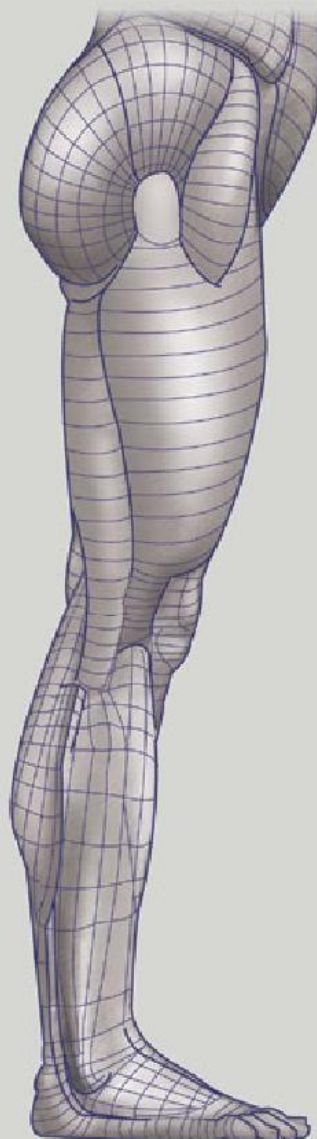
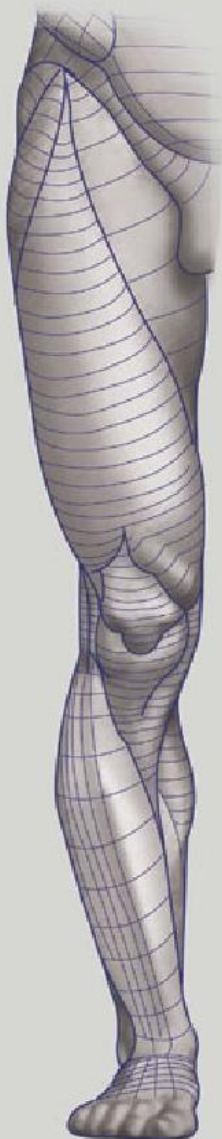
3D SCAN OF LEFT AND RIGHT KNEES



FEMALE LEGS



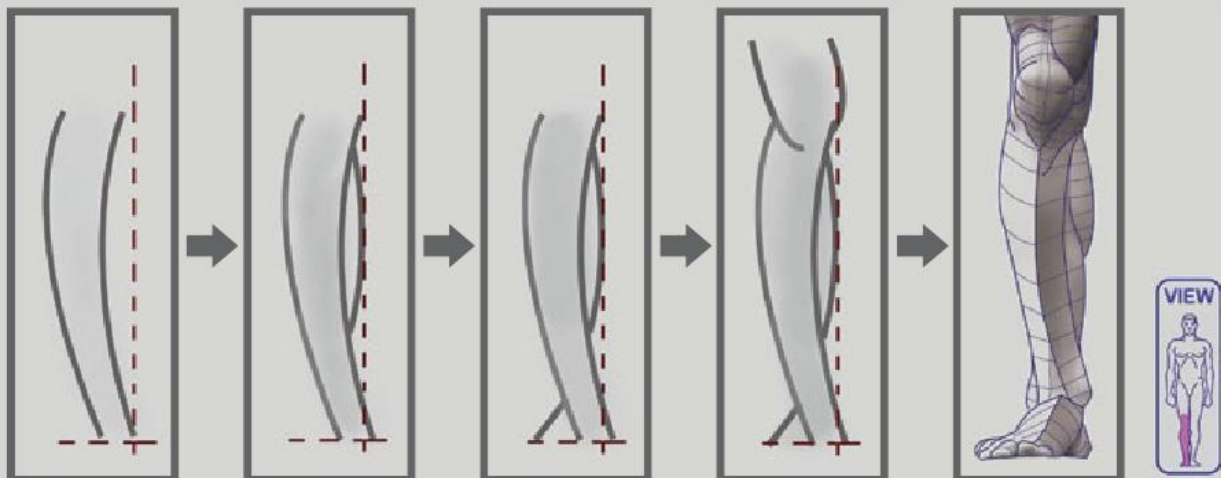
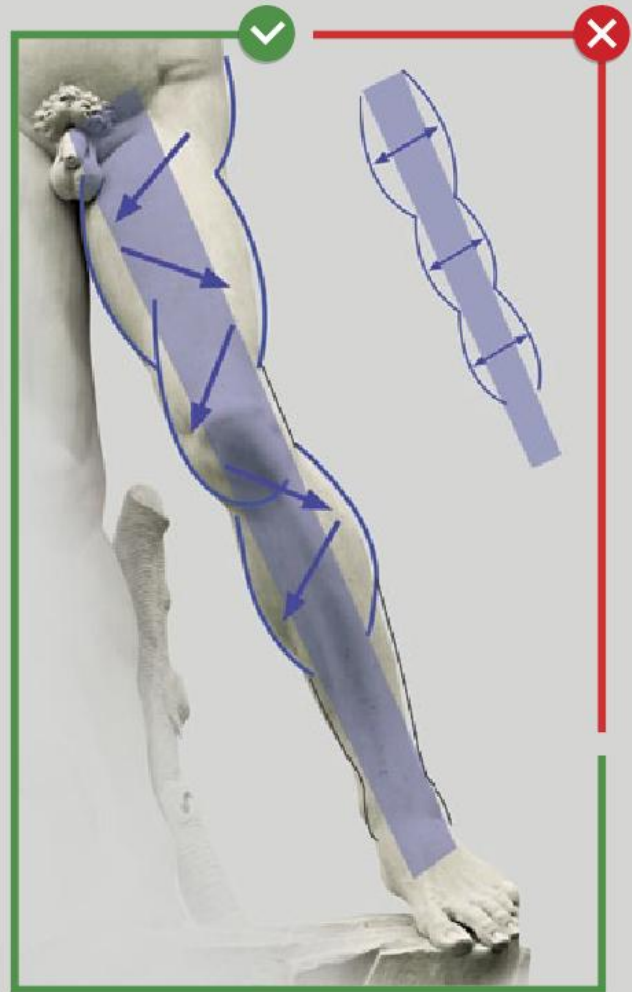
LEG SHAPES VIEWED FROM ALL SIDES



3D SCAN OF LOWER LIMB

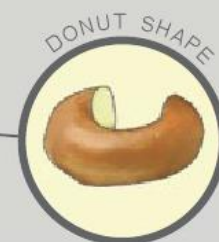
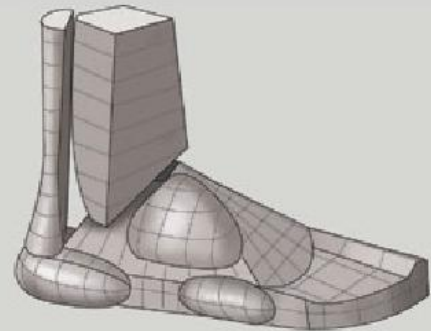


MUSCLES TRAVERSING DOWN THE LOWER LIMB

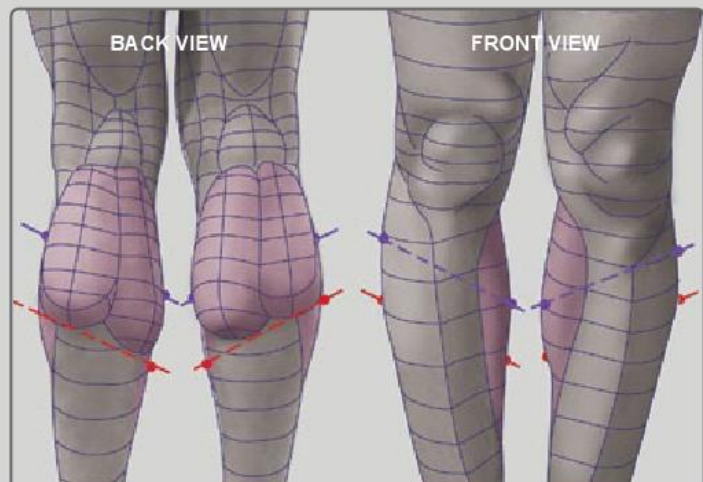


ADDITIONAL SHAPES OF THE LEG AND FOOT

HEEL IS MOSTLY SHAPED BY **FAT PAD**.



THE INNER ANKLE CURVE IS HIGHER THAN THE OUTER ANKLE CURVE.



INNER PORTIONS OF THE CALF MUSCLES ARE LOCATED LOWER AND SHAPES ARE MORE ROUND AND MASSIVE THAN THE OUTER PORTION.

FOOT MUSCLES



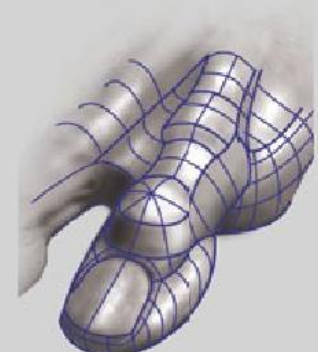
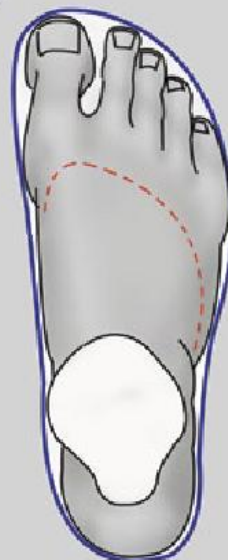
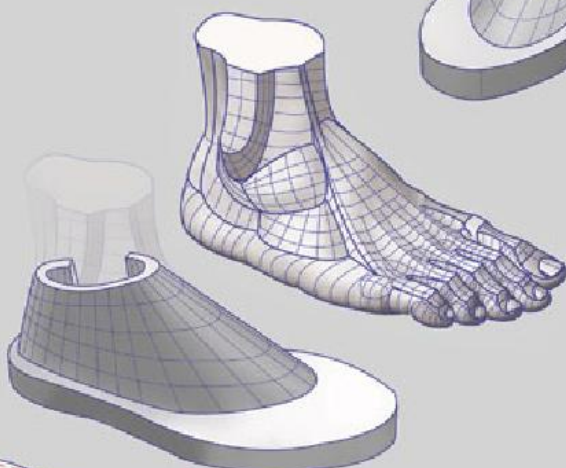
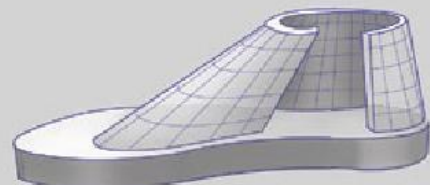
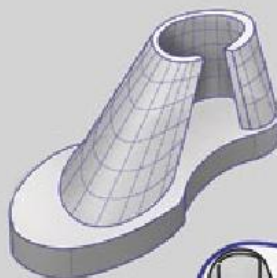
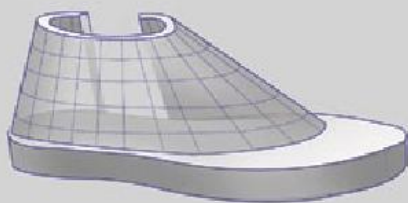
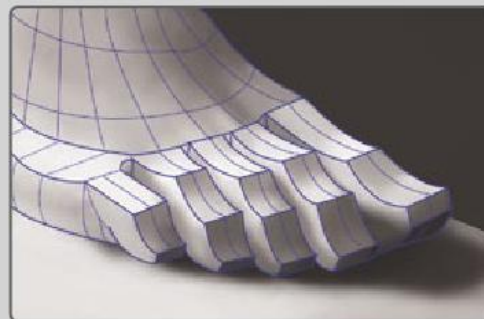
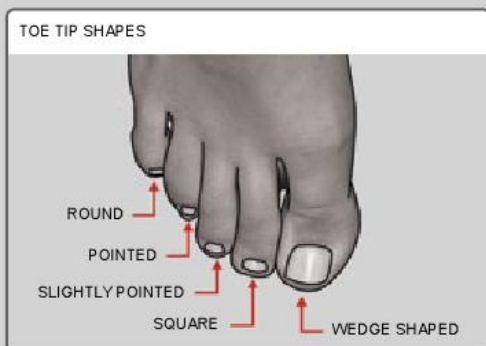
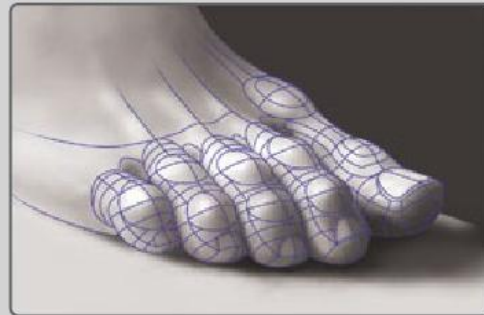
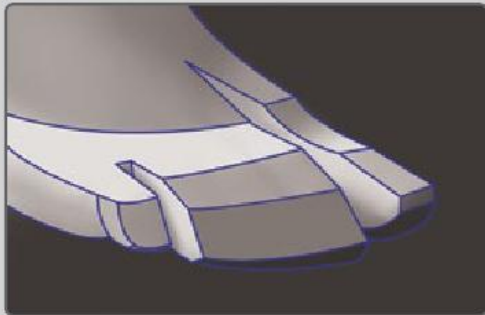
1 PERONEUS LONGUS	8 EXTENSOR HALLUCIS LONGUS	15 SOLEUS
2 PERONEUS BREVIS	9 EXTENSOR HALLUCIS BREVIS	16 FAT PAD
3 EXTENSOR DIGITORUM LONGUS	10 EXTENSOR DIGITORUM BREVIS	17 TIBIALIS POSTERIOR
4 TIBIALIS ANTERIOR	11 PERONEUS TERTIUS	18 FLEXOR DIGITORUM LONGUS
5 MEDIAL SURFACE OF TIBIA BONE	12 ABDUCTOR DIGITI MINIMI	19 ABDUCTOR HALLUCIS
6 MEDIAL ANKLE (M. MALLEOLUS)	13 FLEXOR HALLUCIS LONGUS	20 ACHILLES TENDON
7 LATERAL ANKLE (L. MALLEOLUS)	14 GASTROCNEMIUS	21 CALCANEUS BONE

FOOT SHAPES



RIGHT FOOT

FOOT SHAPES AND FORMING A FOOT



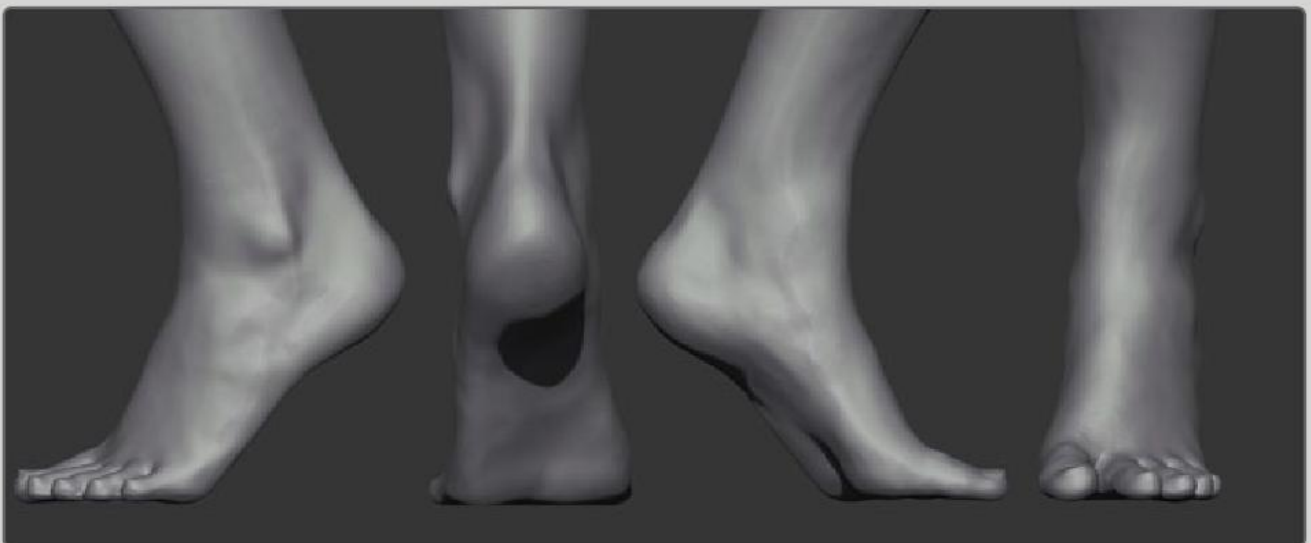
BLOCKING OUT A FOOT



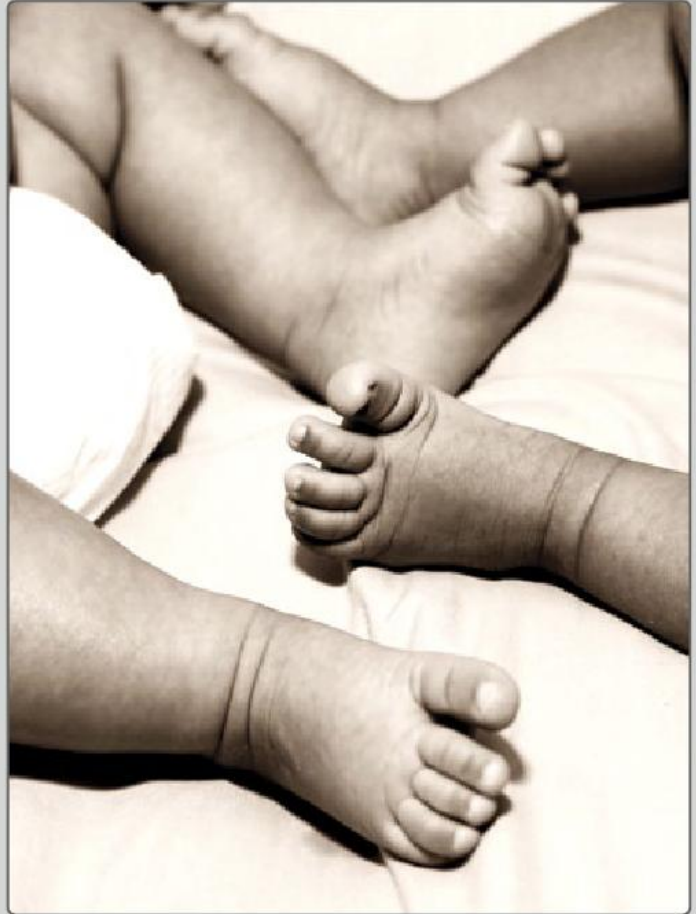
3D SCAN OF RIGHT FOOT



3D SCAN OF LEFT FOOT



BABY FEET



INDEX

"Adam's apple" 97
 "Rhombus of Michaelis" 55
 "S"-Shape 16, 33, 53
 A.S.I.S Anterior Superior Iliac Spine 10, 11, 26, 188, 189, 192, 193
 Abdomen 22, 28
 Abdominal wall fat pad 57, 58
 Achilles tendon 188, 189, 201, 216
 Acromion process 10,11,43
 Adductor tubercle of femur 198
 Anterior tibial condyle 202
 Areola 37
 Armpit 36
 Arms 14
 Bicipital aponeurosis 156
 Block-out 20,21, 54, 101, 106, 172
 Body shapes 13
 Bony landmarks 9
 Bony triangle 36
 Breast fat pad 57, 58
 Breasts 13, 37,38, 39,40
 Buttocks 13
 Chest 13
 Composition 15
 Contrapposto 16
 Coracoid process 156, 160
 Coronoid process of ulna 160, 166-168
 Costal Margin 11, 29
 Deltoid tuberosity of Humerus 43
 Ear 121
 Écorché 24
 Emotions 132-142
 Epicranial aponeurosis 95
 Extensor retinaculum 144, 145
 Eye 103-109
 Eyeball 103
 Eyebrows 103
 Fat accumulation 62
 Figure 25
 Flank fat pad 56, 57, 58, 59
 Foot 14, 216-222
 Forced pronation 153
 Forehead 12
 Glenohumeral joint 160
 Gluteal band 56, 59
 Greater trochanter 188, 189, 192, 194
 Hand 14
 Head 14
 Head of fibula 207
 Head units 19
 Hips 14,16,54
 Iliac crest 10,11,28, 53,54
 Iliac crest line 22
 Iliotibial band 188, 189
 Ilium 196
 Inferior gluteal fat extension 56, 58, 59
 Infraclavicular fossa 36
 Infraclavicular triangle 36
 Infraglenoid tubercle of scapula 158
 Infrapatellar fat pad 56, 57, 58, 207
 Inner thigh fat pad 57, 59
 ischial tuberosity 199
 Ishiopubic ramus 198
 Jawline 102, 110
 Jaws 12, 110

Landmarks 9
 Laryngeal prominence 97
 Lateral epicondyle of femur 192, 207
 Lateral epicondyle of humerus 164
 Lateral gluteal fat pad 56, 58, 59
 Lateral malleolus (lateral ankle) 188, 189, 192, 215, 216
 Lateral tibial condyle 188, 189, 192, 207
 Lazy-"S" 17
 Legs 14,16
 Linea aspera 198, 199
 Lobules 37
 Lower anterior thigh fat pad 57, 58
 Lower back 55
 Mastoid process 94
 Medial epicondyle of femur 192
 Medial malleolus (medial ankle) 188, 189, 192, 205, 215, 216
 Medial tibial condyle 188, 189, 192
 Mouth 111-116
 Movable masses 18,19, 22
 Nail 145, 178, 179
 Navel 13
 Nipple 37,38,39
 Node 113
 Nose 122, 123
 Nostril 123
 Olecranon process of Ulna 158, 164
 Outer thigh fat pad 57, 58, 59
 P.S.I.S Posterior Superior Iliac Spine 10,11, 27, 189, 192, 193
 Palmar aponeurosis 166-168
 Parotid gland 97, 110
 Patellar ligament 188, 189, 207
 Pectineal line of femur 198
 Pectineal line of pubis 198
 Pectoral fat pad 56
 Pes anserinus 198, 199
 Popliteal fat pad 56, 58, 59
 Posterior gluteal fat pad 56, 58, 59
 Pronation 148, 149, 152, 165
 Proportions 19, 90-92, 126-130, 177
 Pubic crest 198
 Pubic fat pad 56, 57
 Pubic symphysis 54
 Quadriceps tendon 207
 Radial deviation (abduction) 180
 Radial sulcus 158
 Radial tuberosity 156
 Richer's band 188,189
 Root (Radix) 123
 Salivary gland 110
 Semipronation 151
 Septum 123
 Shoulder joint 52
 Shoulders 14
 Silhouette 15
 Skin 13, 37
 Skin Fat 13
 Subcutaneous fat pad 37,54, 55, 56, 57,58, 59, 194
 Subcutaneous points 9
 Supination 148, 149, 150, 165
 Supracondylar ridge 162
 Supraglenoid tuberosity 156

Supraorbital ridges 12
 Symmetry 15
 Temporal line 12, 94, 102, 103
 Thumb 178, 179
 Thyroid gland 97
 Tibial tuberosity 188, 189, 192, 207
 Torso 10,11, 20, 21
 Trachea 97
 Tuberosity of ischium 198
 Ulnar deviation (adduction) 180
 Waist 14
 Wing (Alar) 123
 Wing of ilium 10, 11, 28
 Wrinkles 125

BONES:

7th Vertebrae 27, 118
 Bones of foot 187
 Bones of lower limbs 186
 Breastbone 9,11,34,96
 Calcaneus 187, 192, 216
 Capitate 146
 Chest bone 9
 Clavicle 9,10,11,26,27,33,34,35,36,45,96
 Collarbone 9,10,11,26,27,33,34,35,36,45,96
 Cuboid 187
 Distal phalanges 146, 187
 Femur 186, 196, 207
 Fibula 186, 205, 207
 Frontal 94
 Glabella 12
 Hamate 146
 Hand and wrist bones 146
 Head of Ulna 144, 145, 147, 180
 Heel bone 187, 192, 216
 Hipbone 9,10,11,12,26,27,28
 Humerus 36,43,52, 148, 155, 156, 158, 162, 169
 Hyoid 96, 97
 Intermediate cuneiform 187
 Knee cap (Patella) 186, 188, 189, 192, 196, 207
 Lateral cuneiform 187
 Lunate 146
 Mandible 94,96, 110
 Maxilla 94
 Medial cuneiform 187
 Medial epicondyle of Humerus 166-168
 Metacarpals 146
 Metatarsals 187
 Middle phalanges 146, 187
 Nasal 94
 Navicular 187
 Occipital 94
 Orbit 12, 103
 Parietal 94
 Pelvis 9,10,11,12,53, 193
 Phalanx 146
 Pisiform 144, 146, 167, 180
 Proximal phalanges 146, 187
 Radius 148, 155, 156, 158, 162, 169
 Rib cage 10,11,12,28
 Ribs 37,48

Scapula 9,10,11,26,27,89,96, 158
 Shoulderblade
 Skeleton 8,9,12
 Skull 12, 94, 98, 99
 Sphenoid 94
 Spine 10,11
 Spine of scapula 27
 Sternum 9,11,34,96
 Talus 187
 Temporal 94
 Thoracic cage 10,11,12,28
 Thorax 10,11,12,28
 Tibia 186, 196, 202, 205, 207
 Trapezium 146
 Trapezoid 146
 Triquetral 146
 Ulna 148, 155, 156, 158, 162, 169, 170, 175
 Zygomatic 94,95
 Zygomatic arch 95, 110

MUSCLES:

Abdominal muscles 28,29
 Abductor digiti minimi 144, 145, 216
 Abductor hallucis 216
 Abductor pollicis brevis 144, 145
 Abductor pollicis longus 27, 144, 145, 147, 169
 ABS 26, 28, 29
 Adductor longus 188, 189, 198
 Adductor magnus 188, 189, 198
 Adductor pollicis 144, 145
 Anconeus 27, 147, 164
 Biceps brachii 26,27,147, 155, 156, 157
 Biceps femoris 188, 189, 199
 Brachialis 26,27, 147, 160, 161
 Brachioradialis 26, 27, 144, 145, 147, 162, 163
 Broadest back muscle 26,27,50
 Buccinator 95
 Calf 188, 189, 201, 216
 Chest muscle 26,27,30,33,34,35,36,37,45
 Coracobrachialis 147, 160, 161
 Corrugator 95
 Cricothyroid 97
 Deltoid 26,27,30,32,33,34,36,42,43,44,45, 147
 Depressor anguli oris 95
 Depressor labii inferioris 95
 Digastric 97
 Dorsal interossei muscles 145
 Erector spinae 50
 Extensor carpi radialis brevis 27, 145, 147
 Extensor carpi radialis longus 27, 145, 147, 162, 163
 Extensor carpi ulnaris 27, 144, 145, 164
 Extensor digiti minimi 145, 147, 164
 Extensor digitorum 27, 145, 164
 Extensor digitorum brevis 216
 Extensor digitorum longus 188, 189, 202, 216
 Extensor hallucis brevis 216
 Extensor hallucis longus 188, 189, 216
 External oblique 26,27, 28, 30, 31, 53

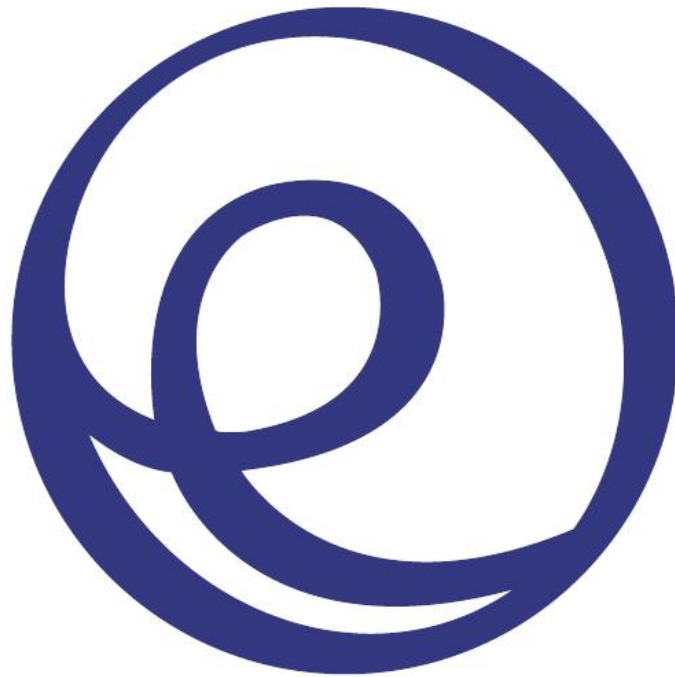
Facial muscles 124
 Flank muscle 26, 27, 28, 30, 31, 53
 Flexor carpi radialis 26, 144, 145, 147, 166-168
 Flexor carpi ulnaris 27, 144, 145, 147, 166-168
 Flexor digiti minimi brevis 144, 145
 Flexor digitorum longus 188, 189, 216
 Flexor digitorum superficialis 144, 145, 147
 Flexor pollicis brevis 144,145, 147, 169
 Frontalis 95
 Gastrocnemius 188, 189, 201, 216
 Gluteus maximus 27, 188, 189
 Gluteus medius 188, 189
 Gracilis 188, 189, 198
 Hamstrings 199, 204
 Hand and wrist muscles 144, 145
 Head muscles 95
 Hyoglossus 97
 Iliopsoas 188, 189
 Infrapinatus 27, 52
 Internal abdominal oblique 28
 Latissimus dorsi 26, 27, 50
 Levator labii superioris 95
 Levator scapulae 97
 Lumbricals 144, 145
 Masseter 95,97, 110
 Mentalis 95
 Muscles of lower limb 188, 189
 Muscles of torso 26-33
 Mylohyoid 97
 Nasalis 95
 Neck muscles 96, 97
 Occipitalis 95
 Omohyoid 97
 Opponens pollicis 144, 145
 Orbicularis oculi 95
 Orbicularis oris 95
 Otto's muscle 95
 Palmaris brevis 144, 145
 Palmaris longus 144, 145, 147, 166-168
 Pectineus 188, 189, 198
 Pectoralis major 26, 27, 30, 33, 34, 35, 36, 37, 45
 Pectoralis minor 35, 37
 Peroneus brevis 188, 189, 203, 216
 Peroneus longus 188, 189, 203, 216
 Peroneus tertius 188, 189, 216
 Platysma 117
 Procerus 95
 Pronator teres 26, 147, 166-168
 Quadriceps 188, 189, 196
 Rectus abdominis 26, 28,29
 Rectus abdominis 28,29
 Rectus femoris 188, 189, 196, 207
 Rhomboid major 27
 Risorius 95
 Sartorius 188, 189, 197
 Saw muscle 26,48,49
 Scalenus anterior 97
 Scalenus medius 97
 Scalenus posterior 97
 Semimembranosus 188, 189, 199
 Semispinalis capitis 97
 Semitendinosus 188, 189, 199

Serratus anterior 26,48,49
 Six-pack 28,29
 Soleus 188, 189, 201, 216
 Splenius capitis 97
 Sternocleidomastoid 26,27,96,97, 118, 119, 120
 Sternohyoid 97
 Sternothyroid 97
 Stylohyoid 97
 Suprahyoid muscles 102
 Temporalis 95, 102, 110
 Tensor fasciae latae 188, 189
 Teres major 27, 50, 52
 Teres minor 27,52
 Tibialis anterior 188, 189, 202, 216
 Tibialis posterior 216
 Transversus abdominis 28
 Trapezius 26,27,30,32,33,46,96,97, 119, 120
 Triceps brachii 26,27,41, 147, 155, 158
 Vastus intermedius 196
 Vastus lateralis 188, 189, 196, 207
 Vastus medialis 188, 189, 196, 207
 Wrist extensors 149, 165, 175
 Wrist flexors 149, 165, 166-168, 175
 Zygomaticus major 95
 Zygomaticus minor 95

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Warren, Goldswain, 90142621,
90096421
Sebastian, Kaulitzki, 140905676
140905781, 140905727,
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130092941, 140905790,
Jessmine, 117845515,
64484038, 64481841,
117468771, 117468276,
117468264, 117465521
Naturesports, 78467805
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110833442
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videodoc, 132651080
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ostill, 57482818
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135266447
Shuravaya, 92798607,
DJTaylor, 127760321,
lekeje, 132107012,
Mykhaylo, Palinchak,
133078430
Inga, Marchuk, 148184015
ollyy, 127373738
doglikehorse, 82312213,
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dreamerve, 113027252
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yurok, 5410689
windu, 68560594
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AJP, 81447517
marcogarnichna, 111032450
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11371808
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85539439
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116560987, 115103842,
125120741, 94683945,
93807922, 94663954,
93808000, 94663908,
94663975, 126009794,
124707709, 93752899,
125153480, 111131864
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Gorich, 17694211
sam100, 472914, 472912,
712065, 712062, 717898,
717890, 717889, 717889,
717885, 717887
MARSIL, 5789050
Hein, Nouwens, 98545544
ostill, 56259355
Nomad, Soul, 9080898
Warren, Goldswain, 90142603
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Nomad, Soul, 102945767,
144120199
Yeko, Photo, Studio, 128487161
Bevan, Goldswain, 123900789
Dan, Kosmayer, 124890325,
124912318, 124898642,
124826890
Warren, Goldswain, 82323036,
82371285, 82444041
Dan, Kosmayer, 124320918,
124320919, 124321279,
124317907
schanck, 96488725
KULISH, VIKTORIIA,
123856489, 123856489
Aleksandr, Markin, 85582952
Marcell, Mizik, 125010791
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Eky, Studio, 80572491,
54371071
Vladimir, Wrangel, 12441757
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vishstudio, 54725959
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bikeriderlondon, 122466650,
122466653, 122466641,
122466647, 122466638
steve, estvanik, 90487690
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sezer86, 135003521
inkti, 95080585
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Vikacita, 102467515
eAlisa, 105596830, 105596833
Kalcutta, 140991940
carlo, dapino, 16832838
Luis, W, 19469767
Piotr, Marcinski, 90142303
Aaron, Amat, 69897235
Dmitry, Lobanov, 145526410
Sero, 143200726, 143200708
rtem, 110345522
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juliasv, 142584553
Oleksii, Sagitov, 81766204
Praiseng, 117990161
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Stanislav, Popov, 62523448
net, 112647532
Zurijeta, 112947532
inkti, 95080585
schanck, 127089758
Praiseng, 123171861
Sementer, 134898943
Hannanarah, 76287324
Dmitry, Naumov, 27592462
Olga, Nikonova, 126867919
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Nomad, Soul, 98375987
Photobac, 135561539
sezei, 112430531
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Vitalinka, 100348361
Phase4Studios, 10037467
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Flashon, Studio, 83828884
Giuseppe, R, 63399870
Khamidulin, Sergey, 87382611
Koroleva, Katerina, 59773162
Mike, Tan, 68141739
Hannanarah, 112701180
nikkos, 128483791
Oksana, Kuzmina, 124726813
Surachai, 90282190
Flashon, Studio, 103998416
Luis, Louro, 78481036
In, Green, 136475681
Oleksii, Khmyz, 88582219
postolit, 82399513
Inga, Marchuk, 57254398
asysun, 100493398
Max, Bukovski, 103574327,
115992457, 103574267,
103574327
Hannanarah, 76297324
Flashon, Studio, 83828884
Ana, Blazic, Pavlovic, 87949297
Velazquez77, 107279963
postolit, 80889808
Bevan, Goldswain, 105417889
sezei, 98595605
serg, dibrova, 106133648,
129136222
Aaron, Amat, 98381048,
88356478
bikeriderlondon, 144915292,
144914482
AJP, 833997115
doglikehorse, 49778341,
49778338, 49778368
Timothy, Boomer, 74689858
Refat, 14848208, 52914331,
38227024, 38442484,
718710734
Zastolskiy, Victor, 40587864
Daniel, Gale, 13940824
Dundanim, 44083488
Alexander, Mak, 86350783
luxorphoto, 68239188
Elena, Ray, 681302
Zurijeta, 68116677
Kuttlvaserova, Stuchelova,
107348326
iodrakon, 38128294
Warren, Goldswain, 62371278,
62323000
Anna, Lurye, 62395804
Sergiy, Telesh, 62395804
Aleksandar, Todorovic,
61064692
AJP, 55389220
Forster, Forest, 32355931
Kuzma, 38378088, 63929784
ChameleonsEye, 115577692
Oleg, Golovnev, 147241340
Sandra.Matic, 129019715
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Alakovlev, 48409932
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iofoto, 3226404
Piotr, Marcinski, 31948714
44205058, 38194312,
98473775, 84029041
A.L.J., 31948714
TOD, Kuhn, 59770861,
59770870, 59770864
ArtFamily, 124432360
Lana, K, 93898561, 98120972,
100152506, 93898381,
93898378, 98120948,
93813823, 93813832,
98120946
Nomad, Soul, 113083900,
114014082
Ase, 99025028
iofoto, 3160808
Andrei, Shumskiy, 88876774
Jochoen, Schoenfeld, 94676488
AstaforovE, 68666050,
68666056, 68650279,
67821814, 67741342
George, Allen, Penton, 32577274
validis, torms, 80895117
Sergeiev, 84811939
Oleg, Mft, 67138873
Hermann, Danzmayr, 310347
jeka, 40329715
Shots, Studio, 116893308
vita, khorzhevska, 127311333
120882262, 120882310,
144077953
Elena, Kharichkina, 90089173
lablonsky, Mykola, 110840702,
125974517, 91203764
O.L.J. Studio, 10157020
leolintang, 108579308
Kozachenko, Olexsandr,
114857757, 114875749,
114875752
matka, Wariatia, 34118832
nanka, 13903318
Geo, Martinez, 274127
vishstudio, 69574723
stihii, 11987539, 141240855
Dundanim, 47032852
Cleomiu, 17568670
MAKENBOLLO, 148822124
David, Davis, 2098801
Kokhanchikov, 38159932
hartphotography, 49547803
Timur, Kulgarin, 34385119
Hugo, Felix, 136000493
Alan, Bailey, 126968855
Lana, Langlois, 65826652
nanka, 17785402
Christo, 59119813, 59119819,
59119807
Suzanne, Tucker, 1321440
Warren, Goldswain, 62371354
82323048, 62395789,
82443999
Deklofenak, 121368253
rangizz, 125847740
Volanda, 134275850
Dan, Kosmayer, 124784974,
124782820, 122024002,
122024002
ollyy, 98507827, 101007865,
98139272
Photobac, 78018261
Isantili, 126522221
Jessmine, 96225569, 96198590
Fatseyeva, 98660858
Olchuk, 148247585
Kiparceter, 65487289
violetblue, 78869944,
131827208
Juriah, Mosin, 956864
somchai, 62892903
iko, 75874852, 78814590,
78874867, 78814865,
80006443
hartphotography, 51858520
Horst, Petzold, 92409688
Sergeiev, 82760317
ArturNyk, 131505737,
132891268
upthebanner, 59227513
Kietr, 88913938
bikeriderlondon, 122040238,
110933405, 147841997
Kietr, 129612107
Luis, Louro, 78228891
Kokhanchikov, 38159935
29712238, 51129436,
68129568, 30315178,
31610710
eelnosiva, 138749075
ZouZou, 72063973
MaxFX, 42114472, 22119046
Kzenon, 12936039
Alan, Bailey, 12747808
postolit, 106193234, 93084466,
95135101
Boonsom, 92967964
Victor, V.Hoguns, Zhugin,
57337156, 56069317
Warren, Goldswain, 62326027
Hasloo, Group, Production,
Studio, 84060625
Kaponia, Aliaksei, 130910744
wtamas, 53709325
Elena, Kharichkina, 108823715
Valua, Vitaly, 115893466,
4634093993, 10030397
David, Davis, 2077001,
2077089, 2076672, 2076607,
2076748, 2077331
Mikhail, Vorotnikov, 2429207
Bernhard, Rohrer, 28722796
simpleman, 95024441
Sergiy, Telesh, 79615884,
79635525, 79271082
Maxim, Kalmikov, 28977712
28977721, 70652293,
70606951, 10020282,
28977718
iko, 77727873, 97302827
William, Perugini, 84814474
bikeriderlondon, 140428529
Serihi, Kobayoku, 71001648
iesnaps, 147768557, 147768070
Eugenio, Marongiu, 126027872
tommaso, lizul, 106845431
ArtFamily, 124432360,
134840402
YanLew, 65835514
Sebastian, Kaulitzki, 130094979
vishstudio, 113680027
Deklofenak, 87147066
tommaso, lizul, 75189454,
75189451, 134739695,
103481333, 88948865
Dmitry, Bruskov, 125408216
Dmitry, Bruskov, 126007073,
127487615, 127487612,
127487627
Sasharijeka, 52336384
vishstudio, 101070997
56280025, 76555699
ollyy, 10517029, 123005791,
91811378, 123005791,
89863132, 95544081,
71358558
Louis, W, 13940698
Igor, Kireev, 14728989,
171340885
FXQuadro, 73134109
luxora, 35682727
wang, song, 124547809
CURAphotography, 104513321
In, Green, 128681260
Mayer, George, 135688174,
146504588
Belovodchenko, Anton,
124849435
Dundanim, 27603112
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alexandrov770, 75684934
Sebastian, Kaulitzki, 133427252
R. O. M. A., 100985506
DRAGONFLY, STUDIO,
90702168
Draw05, 136054865
Victor, Korostyevskiy,
110612435
bikeriderlondon, 144403021,
144570887
Alexander, Image, 149135501
Uros, Jonic, 131892440
Belovodchenko, Anton,
130890383
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margo, black, 104257925
CURAphotography, 128052461
Sergiy, Dubrov, 7364230
Lucky, Business, 94820398
Levichev, Dmitry, 52367508
Guryanov, Andrey, 121658868
Daniel, M., Nagy, 81984739
Vibrant, Image, Studio,
68242369
lablonsky, Mykola, 68606581
Artgo, 98883066
Malakhova, Ganna, 132921032
Oksana, Kuzmina, 131219351,
124728813
greiss, design, 146514278
aniad, 68312775
Ocksay, Bence, 44899549
Kietr, 67947757, 76760608,
75160600
Eric, Isselee, 35687765
Luis, Louro, 73700603
sunabesoyu, 138970757
eelnosiva, 138807854
Chris, Harvey, 1773480
Andreas, Meyer, 31321123
Tinydevil, 94287730, 94287712
Spectral, Design, 66526930
CURAphotography, 79745983
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Innska, 62809045
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Sh, Vector, 137517479
vishstudio, 130162256,
72123028, 76555699,
127868369
holbox, 123446350
Aleksey, Klimts, 46925731
conde, 47773338
Kamira, 52796635, 52796641
PerseolMedusa, 86306503
Chancios, 90928370, 93048880
javarman, 40340862
goghyf3, 148467206
conde, 40381215
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tadijasavic, 881588
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Sergeiev, 134793250
Sebastian, Kaulitzki, 126579557
Sementer, 144883772,
144883771
Dundanim, 25353145
Vasilchenko, Nikita, 95523337
vishstudio, 130300763,
142748520, 100875295,
127889369, 95081403,
95081445, 127889369
Philip, Date, 190015
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130094843
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125789990, 144605633,
125789936, 127036895,
128343718, 127726292
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76353238, 40915099
Eldad, Carin, 135692660
Sergeiev, 104672387
Sebastian, Kaulitzki, 128575907,
128575973, 128575965,
128575968
leo, ello, calvetti, 89966481
decade3d, 127080983,
128697350
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130713542, 130713533
Sebastian, Kaulitzki, 128575298,
128575364, 130095269,
130095167, 128573051
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75700872
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25114889
Alexei, Tacu, 115821382,
115821378, 115821376,
115821379
Piotr, Marcinski, 84909685,
10562888, 38194330,
38194315, 85844866
AleX, Studio, Z, 132903422
Maslov, Dmitry, 53316211
iofoto, 31548664
gregg, Cerenzio, 183867
Serg, Zastavkin, 113626030
Sean, Nel, 145246483
Jeff, Thrower, 112401821,
Pavel, L, Photo, and, Video,
120235651
salajee, 147487383
Bairachnyi, Dmitry, 70278336,
70268846, 69233110,
69447340
AXL, 98208059, 96739112
Maksim, Shmeliov, 52107052,
62671336, 63029314,
63747613
Piotr, Marcinski, 118532787,
118532794, 38194330,
38194315
Jeff, Thrower, 114156706,
114156715
Action, Sports, Photography,
56848450
lablonsky, Mykola, 111343364,
111343376
Igor, Kireev, 92182354
Falcona, 107724905
vishstudio, 113540449,
142748529, 142748523,
142748520
AleX, Studio, Z, 128654051,
128654021
O.L.J. Studio, 65187949,
83170411, 53234237
Anetta, 48891999
InnovationArt, 112247789,
140418397
Sergeiev, 138036872
FXQuadro, 136911587,
86394481
Petrenko, Andriy, 130489996
Andriy, Solovov, 3801688
matka, Wariatia, 9885190
Pressmaster, 42580920
42580938, 42580932
vishstudio, 42119887, 42119857,
105197285
Jessmine, 117804904
Anetta, 41543520, 48819108,
41421901, 48819091
Iakov, Filimonov, 44014683
lablonsky, Mykola, 64748125
Igor, Kireev, 76388302,
82353618, 82353637
Pressmaster, 78238884
Catalin, Petolia, 8887888
ollyy, 56983132
T. Anderson, 93698932
CURAphotography, 104513321
Stefanie, Mohr, Photography,
105197285
Martin, Valigursky, 109132289
Vladimir, Wrangel, 115657282
Solovova, Lyudmila,
122970343
Luca, Bvira, 123978450
Hank, Shiffman, 129511813
138699461, 138699452,
138699481, 138822731
Anetta, 41421910
Dave, Kotinsky, 136050138
Ase, 98901398, 98901398
cristovao, 140158585
AleND, 141052573
rangizz, 141087915
Undrey, 140700025
Guryanov, Andrey, 140540572
Hank, Shiffman, 141654913,
141654910
Kruglov, Orda, 143080630,
144070609
Kiselev, Andrey, Valerevich,
143238081
sassystock, 143636564
hemall, 144680255, 144680264,
14542805, 145542881,
145542817
Guryanov, Andrey, 145681400
Vibrant, Image, Studio,
145034443
PutlichD, 144048916,
144048889
Kiselev, Andrey, Valerevich,
144438340
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