0:00:01.370,0:00:06.270
welcome to lecture 14 in this lecture
I'll talk about some concepts related to

0:00:06.270,0:00:11.130
the axial and appendicular skeleton that
didn't neatly fit into our previous

0:00:11.130,0:00:14.940
lecture on bones
this material can be found in Chapter 7

0:00:14.940,0:00:20.430
of Marieb textbook the first one we want
to look at is the hyoid bone which is a

0:00:20.430,0:00:24.990
u-shaped bone that's just beneath the
mandible and you can see that it's not

0:00:24.990,0:00:29.820
physically connected to the rest of the
skeleton but is suspended by soft tissue

0:00:29.820,0:00:34.140
from the styloid processes of the
temporal bone and this is called the

0:00:34.140,0:00:39.780
stylohyoid muscle that suspends this
very importantly the hyoid bone also

0:00:39.780,0:00:45.809
suspends the larynx the voice box and it
serves as a point of attachment for some

0:00:45.809,0:00:50.430
muscles of the larynx the pharynx as
well as the tongue if you're a fan of

0:00:50.430,0:00:53.730
crime shows you may have heard a
pathologist remark that it could never

0:00:53.730,0:00:58.170
had a fractured hyoid bone resulting
from manual strangulation that is

0:00:58.170,0:01:02.340
strangling of a murder victim by placing
the hands around their neck and cutting

0:01:02.340,0:01:08.720
off air by squeezing tightly and don't

try this at home next I want to review

0:01:08.729,0:01:13.460
the bones and spaces of the orbit and
for the purposes of our lecture exam you

0:01:13.470,0:01:17.460
should be able to label the bones and
the spaces in the orbit given a diagram

0:01:17.460,0:01:22.290
similar to the one that you see here
you'll find an illustration of the orbit

0:01:22.290,0:01:29.909
like this one in Figure 7.12 of Marieb's
textbook first just a quick review of

0:01:29.909,0:01:33.270
the bones and the spaces in the orbit
remember the major features that we

0:01:33.270,0:01:37.079
looked at in lab first of all the roof
of the orbit is formed by the frontal

0:01:37.079,0:01:41.460
bone that we see here the floor of the
orbit is formed by a piece of the

0:01:41.460,0:01:46.979
maxillary bone the lateral wall of the
orbit by the zygomatic bone and the

0:01:46.979,0:01:51.390
medial side of the orbit we're going to
look at two bones in here the most

0:01:51.390,0:01:56.250
lateral one is the ethmoid bone which is
here and then the lacrimal bone which is

0:01:56.250,0:02:00.479
next to it here is two more medial
remember the lacrimal bone is the one

0:02:00.479,0:02:06.060
that had the groove in it to accommodate
the nasolacrimal sac and the tear duct

0:02:06.060,0:02:10.590
if we look at the back of the orbit you
can see that most of the back of the

0:02:10.590,0:02:16.410
orbit is occupied by this bone which is
the sphenoid bone and we looked at a

0:02:16.410,0:02:20.100
couple of structures in this sphenoid bone
one was the optic canal which was a hole

0:02:20.100,0:02:23.250
through the sphenoid bone where the
optic nerve goes from the eyeball back

0:02:23.250,0:02:27.990
to the brain and also the superior
orbital fissure which is shown here this

0:02:27.990,0:02:31.950
is the space remember between the lesser
wing and the greater wing of the

0:02:31.950,0:02:36.840
sphenoid bone and then we also see the
inferior orbital fissure down here in

0:02:36.840,0:02:42.390
the lateral portion of this now you can
see on the right some of the purposes

0:02:42.390,0:02:46.290
for the passageways and foramina and
other structures that we have in the

0:02:46.290,0:02:50.280
bones in and around the orbit and you
can see that most of these provide

0:02:50.280,0:02:55.440
passageways and accomodation for blood
vessels nerves and other structures so

0:02:55.440,0:02:58.440
let me show you a simplified version of
the orbit this is the same view that we

0:02:58.440,0:03:03.120
just looked at and we're going to
reproduce the orbit here and we're gonna

0:03:03.120,0:03:07.140
look at a simplified way to draw the
orbit that hopefully will help you

0:03:07.140,0:03:11.850
remember the major structures first of

all remember said we said that the major

0:03:11.850,0:03:15.420
bone in the back of the orbit was the
sphenoid bone so we'll place the

0:03:15.420,0:03:19.800
sphenoid bone here the top of the orbit
and the roof of the orbit is formed by

0:03:19.800,0:03:24.450
the frontal bone the floor of the orbit
by the maxillary bone the lateral wall

0:03:24.450,0:03:28.830
the orbit by the zygomatic bone and over
here we have the ethmoid and the

0:03:28.830,0:03:33.540
lacrimal bones now outside the orbit if
we go a little bit to a more medial we

0:03:33.540,0:03:38.190
have the maxillary bone again and we
also have the nasal bone here one thing

0:03:38.190,0:03:41.940
I want you to notice is the order of
these going from lateral to medial is

0:03:41.940,0:03:48.510
that these go in alphabetical order so
it might help you remember al MN on that

0:03:48.510,0:03:52.230
side and of course some of the spaces we
could draw very simply we could draw the

0:03:52.230,0:03:56.220
optic canal here we could draw a
superior orbital fissure is represented

0:03:56.220,0:04:00.209
by a space like that and we could also
represent the inferior orbital fissure

0:04:00.209,0:04:04.739
like that so I think you see that this
is a very simplified way of drawing the

0:04:04.739,0:04:08.790
orbit and it will get used to where the
major structures are without having to

0:04:08.790,0:04:14.790
contend with some of the detail that you
see in a diagram like this another item

0:04:14.790,0:04:18.810
we want to cover today in this lecture
are the paranasal sinuses so these are

0:04:18.810,0:04:22.979
of course sinuses around the nasal
cavity so we call them paranasal sinuses

0:04:22.979,0:04:26.920
first let's do a brief review of the
bones in and around the

0:04:26.920,0:04:31.690
nasal cavity and I'm gonna trace in red
here the area of the nasal cavity the

0:04:31.690,0:04:35.950
nasal cavity is bounded by several bones
the Palatine process of the maxillary

0:04:35.950,0:04:39.970
bone right here and in the back of the
hard palate we have the Palatine bone

0:04:39.970,0:04:45.550
itself the roof of the nasal cavity is
formed by the frontal bone here in the

0:04:45.550,0:04:51.400
front the ethmoid bone here on the top
and the sphenoid bone in the back and

0:04:51.400,0:04:55.330
toward the bottom the other thing we
have in the nasal cavity that we looked

0:04:55.330,0:04:59.710
at in lab were the conchae so you
remember that these are protruding bones

0:04:59.710,0:05:04.930
that project into the nasal cavity this
bone is the inferior nasal Concha which

0:05:04.930,0:05:10.030
is a bone unto itself and then we have a
middle and the superior nasal Concha

0:05:10.030,0:05:15.460
both of these belong to the ethmoid bone

the final structure that we looked at in

0:05:15.460,0:05:20.080
lab was we looked at the partitions that
separate the nasal cavity into two

0:05:20.080,0:05:22.540
halves
we had a bone in the bottom and the

0:05:22.540,0:05:26.740
center that was projecting like this
kind of a plow shaped bone that we

0:05:26.740,0:05:32.440
called the vomer and the top portion of
the bony nasal septum is formed by the

0:05:32.440,0:05:38.290
perpendicular plate of the ethmoid bone
sinuses themselves are hollowed out

0:05:38.290,0:05:44.140
spaces in some of the skull bones and
these hollowed out spaces like this

0:05:44.140,0:05:50.800
like this these actually do open to the
nasal cavity so as you might expect

0:05:50.800,0:05:55.720
these are lined with mucous membranes
and the mucus is once again here to

0:05:55.720,0:06:01.210
protect and to trap any kind of
particulate matter the sinuses reduce

0:06:01.210,0:06:04.780
the weight of the skull and they also
provide the voice with a more bassy

0:06:04.780,0:06:09.910
quality that is an increased resonance
now the conchae that we looked at a

0:06:09.910,0:06:12.940
couple of minutes ago in the nasal
cavity have some important functions

0:06:12.940,0:06:17.980
that we want to talk about their major
purpose really is that when air is

0:06:17.980,0:06:22.630
breathed into the nasal cavity these
create turbulence and eddys inside the

0:06:22.630,0:06:27.400
nasal cavity that serve to do a few
things one of the things that does is it

0:06:27.400,0:06:31.360
directs particles against the mucous so
remember that the walls of this are

0:06:31.360,0:06:35.500
lined with mucous and the particulate
matter that we breathe in through the

0:06:35.500,0:06:40.009
nose is trapped in the mucus so that we
can expel it by sneezing or

0:06:40.009,0:06:45.499
blowing our nose the second thing that these do is
because of the turbulence that's created

0:06:45.499,0:06:48.619
in here
they basically slow air movement down

0:06:48.619,0:06:53.180
and the slow movement of the air allows
it time to come in contact with the

0:06:53.180,0:06:57.619
moist mucous membranes of the nasal
cavity so that the air is warmed and humidified

0:06:57.619,0:07:02.509
and the third thing these do
is they direct air against the superior

0:07:02.509,0:07:08.830
portion of the nasal cavity so as we
breathe air in molecules go up this way

0:07:08.830,0:07:14.689
against the roof of the nasal cavity and
right here is a perforated plate of bone

0:07:14.689,0:07:19.099
which you remember from the bone lab is
the cribriform plate of the ethmoid bone

0:07:19.099,0:07:24.770
and in the roof of the nasal cavity we

have nerves olfactory nerves which are

0:07:24.770,0:07:29.330
for the sense of smell and these nerves
actually pass upwards they have

0:07:29.330,0:07:32.899
processes that pass up through the
cribriform plate and eventually these

0:07:32.899,0:07:39.379
will go back to the brain so the conchae
are pivotal in directing the air against

0:07:39.379,0:07:44.330
these nerves on the top of the nasal
cavity and allowing us to sense odor

0:07:44.330,0:07:50.779
molecules in the air a bit better in
this slide you can see the location of

0:07:50.779,0:07:57.169
the sinuses and once again these sinuses
you can see surround the nasal cavity so

0:07:57.169,0:08:01.039
we call these paranasal sinuses
now inflammation of the sinuses is

0:08:01.039,0:08:06.649
called sinusitis remember we tack on the
suffix -itis is to indicate inflammation of

0:08:06.649,0:08:11.479
some body part so someone who's
experiencing pain due to sinusitis will

0:08:11.479,0:08:15.740
typically feel the pain in an area
associated with that particular sinus

0:08:15.740,0:08:19.009
that's infected for example somebody
that had an infection here would have

0:08:19.009,0:08:23.059
pain more or less in the cheek area this
would be an inflammation of the

0:08:23.059,0:08:28.189
maxillary sinus or maxillary sinusitis
somebody that had a inflammation in the

0:08:28.189,0:08:31.909
frontal sinuses here would have more of
what would feel like a headache or a

0:08:31.909,0:08:36.949
pain just above the eyes so as with the
orbit what I'd like you to be able to do

0:08:36.949,0:08:41.360
is to label the diagram similar to the
one that you see here either one of

0:08:41.360,0:08:47.690
these should be pretty straightforward
and really not too difficult we want to

0:08:47.690,0:08:51.110
talk a little bit about the infantile
skull and as we saw in lab when you

0:08:51.110,0:08:53.990
looked at the fetal skulls
now the fetal and infant skulls

0:08:53.990,0:08:57.920
are different in certain respects from
adult skulls first you can see in this

0:08:57.920,0:09:02.839
diagram that the infant skull is flatter
if we look the extent of it from here to

0:09:02.839,0:09:09.800
about here it's flatter than the adult
skull and also the jaw is shorter so

0:09:09.800,0:09:15.050
there are a couple of differences that
we can see right away as a child grows

0:09:15.050,0:09:20.480
the skull will increase in height so it
will grow this way and the jaw will also

0:09:20.480,0:09:26.240
extend more this way to accommodate more
teeth another feature you'll notice is

0:09:26.240,0:09:29.660
that the skull bones don't join each
other with sutures as they do in the

0:09:29.660,0:09:34.070
adult skull but are separated by soft

tissue the tissue that you see indicated

0:09:34.070,0:09:40.250
in green here is soft fibrous tissue
remember from the lecture on bones that

0:09:40.250,0:09:44.200
the skull bones formed by something we
called intramembranous ossification a

0:09:44.200,0:09:49.459
process which replaces soft fibrous
tissue with bone and by looking at the

0:09:49.459,0:09:54.170
skull bones here you can see the site at
which ossification has started so let's

0:09:54.170,0:09:59.660
say right here and the ossification
process has begun moving outward from

0:09:59.660,0:10:04.250
that center of ossification and here you
can see the leading edge of the newly

0:10:04.250,0:10:08.810
formed bone here and here for example
and each of the skull bones will do this

0:10:08.810,0:10:12.529
and you notice the leading edge of the
parietal bones here leading edge of the

0:10:12.529,0:10:15.770
frontal bone over here they haven't
quite met so they're separated by the

0:10:15.770,0:10:20.690
soft tissue and what these soft tissues
do is they form these structures that

0:10:20.690,0:10:25.490
are known as fontanelles here we can see
the largest fontanel which is known as

0:10:25.490,0:10:31.160
the anterior fontanelle in common usage
the anterior fontanelle is also known as

0:10:31.160,0:10:35.000
the soft spot if you've ever put your
finger on the top of a newborn's head

0:10:35.000,0:10:38.660
you may have felt there even the seen
the pulsation of blood vessels beneath

0:10:38.660,0:10:42.890
this area this gives you an idea about
how thin the fibrous membranes are and

0:10:42.890,0:10:48.279
how important properly formed skull
bones are in order to protect the brain

0:10:48.279,0:10:52.220
now the fontanelles are important for a
couple of reasons first they allow

0:10:52.220,0:10:56.630
movement of the skull bones during the
newborn's passage through the birth canal

0:10:56.630,0:11:00.680
which is a tight squeeze to say the
least and secondly the fontanel's also

0:11:00.680,0:11:06.290
allow some brain growth during the early
years of infancy onto the vertebral

0:11:06.290,0:11:09.020
column
in the lab we examined the individual

0:11:09.020,0:11:11.900
bones of the vertebral column and talked
about the characteristics of the

0:11:11.900,0:11:16.220
vertebrae in each area of the vertebral
column what we want to do here is talk

0:11:16.220,0:11:20.030
in some general terms about how the
vertebral column forms a unit how the

0:11:20.030,0:11:23.930
vertebrae are separated from one another
and about the curves that are present in

0:11:23.930,0:11:28.700
the vertebral column first notice in
this slide that the vertebral column is

0:11:28.700,0:11:35.000
not straight so it's not a straight line

from here down but is actually curved

0:11:35.000,0:11:40.130
and has somewhat of a serpentine or a
snake like shape each curve of the

0:11:40.130,0:11:43.220
vertebral column is named for the area
of the vertebral column where that curve

0:11:43.220,0:11:50.360
is found hence there are cervical curves
a thoracic curve lumbar curve and a

0:11:50.360,0:11:55.430
sacral curve notice too that two of
these curves the sacral and the lumbar

0:11:55.430,0:12:01.220
curves are convex toward the anterior of
the body or what we mean by convex is

0:12:01.220,0:12:06.530
they bulge forward like this so we would
call this type of structure or bulging

0:12:06.530,0:12:13.820
convex and they're also called concave
toward the posterior so concave means

0:12:13.820,0:12:18.800
that it's more or less indented toward
the back the thoracic and sacral curves

0:12:18.800,0:12:24.170
on the other hand are convex toward
the posterior as you see here or we

0:12:24.170,0:12:29.900
could also say that they are concave
toward the front now a curve that is

0:12:29.900,0:12:36.920
convex anteriorly like the lumbar curve
is known as a lordotic curve while a

0:12:36.920,0:12:42.530
curve that is convex posteriorly is
known as a kyphotic curve so this curve

0:12:42.530,0:12:47.690
here the thoracic curve would be known
as a kyphotic curve

0:12:47.690,0:12:51.590
you'll also notice in this slide that
the thoracic and sacral curves are

0:12:51.590,0:12:57.170
labeled primary curves it's the primary
here primary here this means that these

0:12:57.170,0:13:00.770
curves are present at birth and help
provide space for the organs in the

0:13:00.770,0:13:03.260
thorax and pelvis
for that reason they're sometimes

0:13:03.260,0:13:07.250
referred to as accommodation curves since
they accommodate the organs in those

0:13:07.250,0:13:12.770
areas the other two curves the cervical
and the lumbar curves you'll see the

0:13:12.770,0:13:16.580
word secondary next to them these curves
are not present at birth but formed when

0:13:16.580,0:13:19.970
a baby begins to develop sufficient
musculature to pick up its head

0:13:19.970,0:13:24.500
and walk so the cervical and lumbar
curves developed later on once a baby

0:13:24.500,0:13:30.050
develops their muscles in the next slide
you can see several situations in which

0:13:30.050,0:13:34.850
the normal orientation of the vertebral
column is disturbed scoliosis which is

0:13:34.850,0:13:39.019
shown on the left is an abnormal lateral
curvature of the spine easily seen by

0:13:39.019,0:13:44.899
observing that the spine viewed from the
back is not straight but is angled in

0:13:44.899,0:13:49.430
certain areas giving the vertebral

column an S or question mark shaped

0:13:49.430,0:13:53.930
curvature this may arise from
abnormalities president birth called

0:13:53.930,0:13:58.670
congenital may have an unknown cause or
maybe even secondary to some other

0:13:58.670,0:14:03.800
conditions such as physical trauma
neuromuscular conditions and so on

0:14:03.800,0:14:08.709
kyphosis is an exaggerated curved-in the
thoracic region of the vertebral column

0:14:08.709,0:14:12.680
remember from what we talked about
earlier that a curve which is convex

0:14:12.680,0:14:18.470
posteriorly such as this is known as a
kyphotic curve and an exaggeration of the

0:14:18.470,0:14:23.389
kyphotic curve in the thoracic vertebral
column is called kyphosis this is common

0:14:23.389,0:14:27.620
in patients that have advanced
osteoporosis and may result from minor

0:14:27.620,0:14:31.430
compression fractures in which the
anterior portion of the vertebral bodies

0:14:31.430,0:14:37.670
have compression fractures a lordosis
which is the last one here is an

0:14:37.670,0:14:42.500
exaggerated lumbar curve so that the
lordotic curve here in the lumbar

0:14:42.500,0:14:47.959
region is exaggerated this is common in
pregnant women as the growing fetus puts

0:14:47.959,0:14:52.339
more strain on the lower vertebral
column and is also not uncommon in

0:14:52.339,0:14:56.870
people with poor abdominal muscle tone
in the diagram on the right on this

0:14:56.870,0:15:00.920
slide you can see a partially cutaway
view of the vertebral column exposing

0:15:00.920,0:15:05.809
the intervertebral discs that separate
the vertebrae the intervertebral discs

0:15:05.809,0:15:10.009
along with the vertebrae above and below
it actually form a type of joint which

0:15:10.009,0:15:14.870
is called a symphysis which we'll talk
about in the lecture on articulations

0:15:14.870,0:15:20.500
here you can see a transverse section at
the level of the lumbar vertebral column

0:15:20.500,0:15:25.129
sectioning and intervertebral discs to
show it's two layers which are indicated

0:15:25.129,0:15:30.380
here the outer layer is called the
anulus fibrosus and is composed of

0:15:30.380,0:15:33.740
fibrocartilage remember from our tissue
lectures that

0:15:33.740,0:15:36.650
fibrocartilage is a tough type of
cartilage with a great number of

0:15:36.650,0:15:41.180
collagen fibers in it so it's very
resilient and very tough the inner

0:15:41.180,0:15:46.430
portion of the intervertebral disc is a
gelatin like material called the nucleus

0:15:46.430,0:15:51.670
pulposus it acts like a rubber ball
providing elasticity and compressibility

0:15:51.670,0:15:56.060
in the vertebral column in general lives

consist of the same type of material

0:15:56.060,0:16:01.910
that we find in connective tissue that
material we called proteoglycans on the

0:16:01.910,0:16:04.970
right you can see what happens when
herniation of an intervertebral disc

0:16:04.970,0:16:09.410
occurs for example from trauma or from
bending forward to lift a heavy weight

0:16:09.410,0:16:13.520
and you can see this portion of the disc
here is protruding the nucleus pulposus

0:16:13.520,0:16:17.720
is protruding through the anulus
fibrosus on the outside and this can

0:16:17.720,0:16:21.980
cause compression of the nerve root if
the material inside the nucleus pulposus

0:16:21.980,0:16:26.930
leaks out this can also cause some
irritation to the spinal nerves and

0:16:26.930,0:16:33.860
caused quite a bit of pain in the lab we
use the terms true false and floating to

0:16:33.860,0:16:37.310
describe the ribs based on whether or
not they were connected by cartilage to

0:16:37.310,0:16:42.020
the sternum and if they were exactly how
they were connected remember that we

0:16:42.020,0:16:48.770
called rib pairs 1 through 7 true ribs
we call ribs 8 9 and 10 on each side

0:16:48.770,0:16:55.250
false ribs and we called ribs 11 and 12
floating ribs now we can use some more

0:16:55.250,0:16:58.640
anatomically descriptive terms to
describe the connections of the ribs

0:16:58.640,0:17:04.130
for example true ribs numbers 1 through
7 are also known as vertebrosternal

0:17:04.130,0:17:08.210
ribs and they're named so because they
are connected in the back to the

0:17:08.210,0:17:12.770
vertebrae and they're connected in the
front by a separate cartilage each to

0:17:12.770,0:17:18.740
the sternum ribs 8 9 and 10 are also
known as vertebrochondral ribs these

0:17:18.740,0:17:22.760
were the false ribs and these are called
this because they are connected in the

0:17:22.760,0:17:26.390
back to the vertebrae once again but
they are connected to the sternum by a

0:17:26.390,0:17:28.940
common cartilage as we've spoken about
before

0:17:28.940,0:17:34.940
and finally ribs 11 and 12 are also
known as vertebral ribs because they're

0:17:34.940,0:17:38.420
only connected in the back to the
vertebrae but they have no connection in

0:17:38.420,0:17:43.430
the front to the sternum in lab we
talked about an imaginary line that we

0:17:43.430,0:17:47.180
can draw in the pelvis from the sacral
promontory

0:17:47.180,0:17:53.180
which is here around the area of the
inside of the pelvis and we trace that

0:17:53.180,0:17:59.210
line out something like this and this
area we refer to as the pelvic brim and

0:17:59.210,0:18:05.360
the area defined by the pelvic brim

right here is known as the pelvic Inlet

0:18:05.360,0:18:09.890
in the side view of the pelvis on the
right you can see that the pelvic brim

0:18:09.890,0:18:15.040
divides the pelvis into a superior
portion here and an inferior portion

0:18:15.040,0:18:22.370
down here the superior portion that is
everything above the pelvic brim is also

0:18:22.370,0:18:28.550
known as the greater pelvis but it's
also known as the false pelvis the

0:18:28.550,0:18:33.470
reason for this is that this is a larger
area but the actual pelvic organs are

0:18:33.470,0:18:39.650
down in this area here below the pelvic
brim so we name it that way now the

0:18:39.650,0:18:44.840
inferior portion of the pelvis down here
is known as the true pelvis but it's

0:18:44.840,0:18:50.030
also known as the lesser pelvis so don't
get those confused the names are

0:18:50.030,0:18:54.740
slightly confusing but realize that the
larger area is called greater the

0:18:54.740,0:18:59.390
smaller area is called lesser but the
area that has the organs the true pelvic

0:18:59.390,0:19:03.530
organs in it is known as the true pelvis
and the area that does not have the true

0:19:03.530,0:19:08.180
pelvic organs in it is known as the
false pelvis so try and keep that

0:19:08.180,0:19:13.400
straight notice the area on the bottom
portion of the pelvis is delineated by

0:19:13.400,0:19:20.510
the pubic bone in the front here by the
ischial spines here and here and by the

0:19:20.510,0:19:27.050
sacrum and coccyx posteriorly this area
on the bottom here is known as the

0:19:27.050,0:19:34.640
pelvic outlet and you can see that again
here and here now in this slide you can

0:19:34.640,0:19:38.720
see a comparison of the male and female
pelvis the differences being necessary

0:19:38.720,0:19:43.310
to accommodate childbirth in the female
of course in general the male pelvis as

0:19:43.310,0:19:51.260
you can see is taller this way and is
narrower this way than the female pelvis

0:19:51.260,0:19:56.540
and you can see some other differences
described below in this small table down

0:19:56.540,0:20:00.890
here notice the area of the pelvic Inlet
is more heart-shaped

0:20:00.890,0:20:08.810
in the male while it's more oval in the
female and the pelvic outlet bounded

0:20:08.810,0:20:13.670
laterally by the ischial spines as you
can see in the bottom is much narrower

0:20:13.670,0:20:19.790
in the mail and it's much wider in the
female now this of course allows the

0:20:19.790,0:20:24.020
newborn to pass through this area much
more easily also the curve of the sacrum

0:20:24.020,0:20:28.160
and the coccyx and the female is less
than it is in males so the pelvic outlet

0:20:28.160,0:20:34.340
is once again larger in females

now we explored the pectoral and pelvic

0:20:34.340,0:20:40.310
girdles in lab remember we defined a
girdle as something that allows the

0:20:40.310,0:20:44.780
limbs to connect with the axial skeleton
recall the difference in the depth of

0:20:44.780,0:20:50.060
the glenoid cavity of the scapula versus
that of the acetabulum in the pelvis and

0:20:50.060,0:20:55.190
as you can see in this table the depth
of the fossa or cavity in which the

0:20:55.190,0:20:59.330
heads of these large limb bones
articulate has implications for

0:20:59.330,0:21:03.580
stability so for example in the pectoral
girdle where we have the glenoid fossa

0:21:03.580,0:21:09.680
notice that the socket for the joint is
very shallow and what this does is

0:21:09.680,0:21:14.990
essentially maximize movement but it
also reduces strength so there's a

0:21:14.990,0:21:19.400
trade-off here whereas when we compare
that with the pelvic girdle we see that

0:21:19.400,0:21:26.210
the acetabulum which forms a very deep
socket also provides minimum movement or

0:21:26.210,0:21:30.740
reduced movement I should say but it
also maximizes strength so there's a

0:21:30.740,0:21:35.840
trade-off depending on how exactly the
joint actually comes together now we

0:21:35.840,0:21:40.610
also want to talk about the foot and
talked about its arches as we discussed

0:21:40.610,0:21:45.560
in lab the calcaneus or heel bone the
heads of the metatarsals and the distal

0:21:45.560,0:21:50.510
phalanges rest on whatever surface our
foot is placed so here we would have the

0:21:50.510,0:21:55.340
toes on the floor for example the heads
of the metatarsals on the floor and the

0:21:55.340,0:22:00.350
calcaneus on the floor as well down here
notice on this slide that the area

0:22:00.350,0:22:05.330
between the calcaneus and the heads of
the metatarsals isn't flat on the floor

0:22:05.330,0:22:11.360
but actually has an arch present in it
the major arches we'll talk about here

0:22:11.360,0:22:18.170
include the lateral longitudinal arch
and the medial longitudinal arch both of

0:22:18.170,0:22:21.020
which run lengthwise between the
calcaneus and the heads of the

0:22:21.020,0:22:26.960
metatarsals the medial longitudinal arch
which is on the inner side of the foot

0:22:26.960,0:22:31.970
it is commonly called the instep on the
lateral side of the foot you can see the

0:22:31.970,0:22:36.770
lateral longitudinal arch and finally
running across the top of the foot you

0:22:36.770,0:22:42.110
can also see the transverse arch which
is right here the arches of the foot are

0:22:42.110,0:22:46.340
important because they provide more even
distribution of the weight over the

0:22:46.340,0:22:51.380
heart and soft tissues in the foot and

they also provide more leverage when

0:22:51.380,0:22:56.780
we're walking or running in this slide
you can see the area encompassed by each

0:22:56.780,0:23:04.120
arch in a superior view of the foot the
large medial longitudinal arch

0:23:04.120,0:23:10.460
encompasses the area of a portion of the
calcaneal bone the talus the navicular

0:23:10.460,0:23:16.550
and also the metatarsals and phalanges
of the first three toes as you can see

0:23:16.550,0:23:21.290
here the lateral longitudinal arch
encompasses the area on the lateral side

0:23:21.290,0:23:26.960
of the calcaneus the cuboid and the
fourth and fifth metatarsals and

0:23:26.960,0:23:33.830
phalanges as you see here finally as we
said before the transverse arch extends

0:23:33.830,0:23:38.030
across the top of the foot and as you
can see here this encompasses the cuneiforms

0:23:38.030,0:23:45.350
the cuboid as well as the basis of
the metatarsals well that concludes our

0:23:45.350,0:23:49.250
coverage of the additional items related
to the axial and appendicular skeleton

0:23:49.250,0:23:53.960
hope you enjoyed it take the brief quiz
that follows to be sure you understood

0:23:53.960,0:23:57.880
everything and we'll see you next time