

## Entomology and Osteology



## Osteology

# Historical Development



In the 1800s, scientists began studying skulls. This laid the framework for today's knowledge.

In 1932 the FBI opened the first crime lab.

The Smithsonian Institution became its working partner in the identification of human remains.

Soldiers killed in World War II were identified using anthropologic techniques



## John Wayne Gacy "The Clown that Killed"

John Wayne Gacy, Jr. was an American serial killer, who was also known as the "Killer Clown".

Gacy was greatly admired and liked by most people who knew him.

Gacy was a sharp businessman, who spent his free time hosting elaborate street parties for friends and neighbors, he also dressed as "Pogo the Clown" and entertained children at local hospitals.

He was convicted of the torture, rape and murder of 33 males between 1972 and 1978. His targeted victims were young males. Twenty-six of the victims had been buried in a crawl space underneath Gacy's home.

He had been sentenced to death for 12 of the murders, and to natural life in prison for the other murders.



At the request of Gacy defense counsel, he had spent over 300 hours with doctors undergoing psychological test to determine whether he was mentally competent to stand trial. Gacy had tried to convince the doctors that he was suffering from a multiple personality disorder. His lawyers opted to plead not guilty by reason of insanity to the charges put against him. His lawyers opted to plead not guilty by reason of insanity to the charges put against him.

## Testimonies

Three psychiatric experts appeared for the defense at Gacy's trial had testified him to be paranoid schizophrenic suffering from a multiple personality disorder.

The prosecution's case was that Gacy was sane, and fully in control of his actions. Producing several witnesses to testify to the pre mediation of Gacy's actions and efforts he used to escape detection.

Doctors who refuted the defense doctors's claims of multiple personality and insanity. Two of the witnesses who testified had confessed that Gacy had made the dig trenches in the crawl space under his home.



Witness, Michael Rossi, testified that on August 1977, Gacy marked a location in the crawl space with sticks and told him to dig a drainage trench.

He also testified that Gacy would periodically look into the crawl space to make sure Gacy's other employees did not deviate from the precise locations he had marked for digging.

After Gacy's arrest, he had testified himself that he had employees dig trenches so that he would "have graves available".

On the first day that the police began their digging, they found two bodies. One of the bodies was that of John Butkovich who was buried under the garage. The other body was the one found in the crawl space. As the days passed, the body count grew higher. Some of the victims were found with their underwear still lodged deep in their throats.





## Defense Presented

During the third week of the trial Gacy's defense team tried to raise the possibility that all 33 murderers were accidental erotic asphyxia deaths. The Cook County Coroner countered this with evidence that Gacy's claim was impossible.

February 29th, 1967, one of the youth that Gacy had sexually assaulted, Donald Voorhees, testified to his ordeal at the hands of Gacy. Gacy had paid another youth to beat him and spray mace in his face so that he would not testify against him. The youth felt unable to testify, attempted to briefly before being asked to step down.

Donnelly, another young male, was distressed as he tried to recall all the abuse he encountered by Gacy, he came close to breaking down several times. Gacy repeatedly laughed at Donnelly's expense as he testified against him.

The defense tried to discredit Donnelly's testimony, but Donnelly refused to refute his testimony. On the fifth week of the trial Gacy wrote a letter to Judge Garrippo requesting a mistrial. Gacy claimed he was against the defense's insanity plea, and that his defense team had not called enough witnesses; he was denied the opportunity to testify, and the statements given by police after his arrest were false, "self-serving" statements used by the prosecution.

The reason Gacy gave for them being buried so close together was that he was running out of room and needed to conserve space.



## Jury Deliberation:

Jury deliberated for less than two hours, finding Gacy guilty of each murder. The following day both the prosecution and defense made alternate pleas for the sentence that jury should decide.

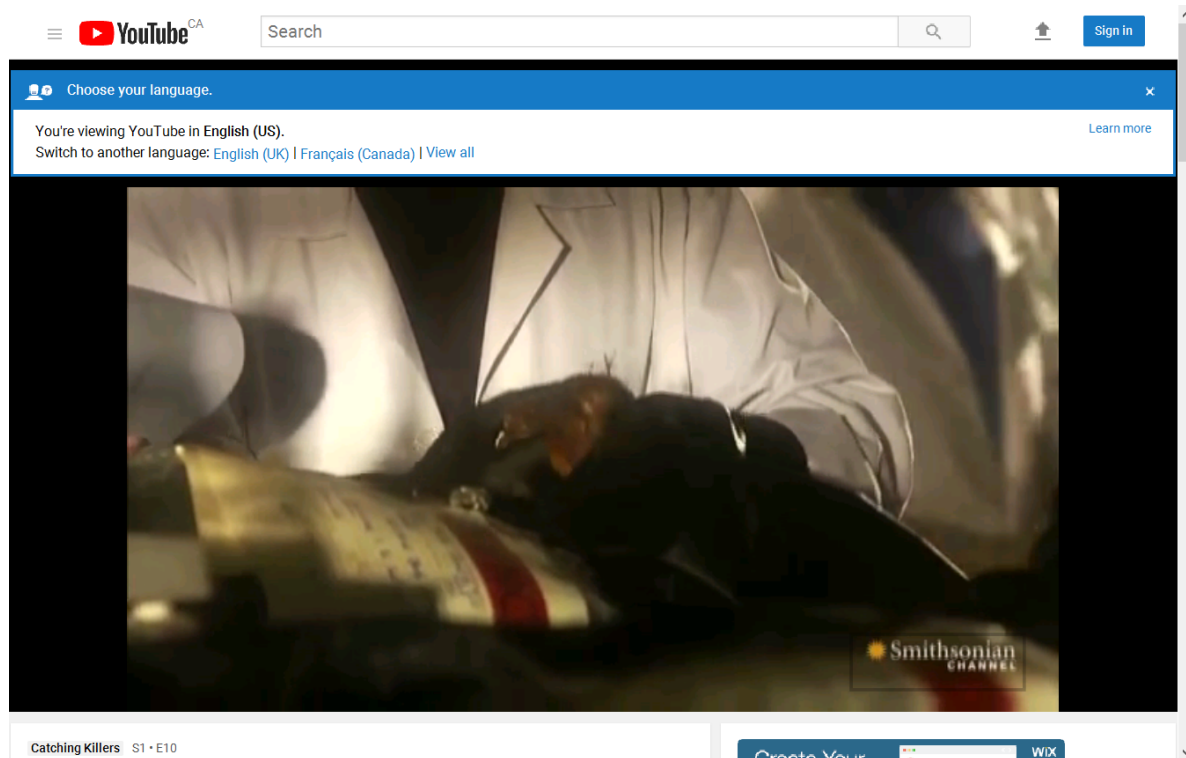
Prosecution requested, death sentence for each murder committed.

Defense requested, life imprisonment.

Jury's final decision after two hours was to sentence Gacy to death. He was executed May 10th, 1994 at 12:58 pm by lethal injections in Illinois.

The screenshot shows a YouTube interface. At the top, there's a search bar and a 'Sign in' button. Below that, a blue banner prompts the user to 'Choose your language' and shows the current language is English (US). The main video player displays a news anchor, Dick Johnson, with the text 'DICK JOHNSON EYEWITNESS NEWS' overlaid. The video title is 'Execution of Gacy' by KC Cooper50, with 92,141 views and 144 likes. To the right, the 'Up next' section lists several related videos:

- John Wayne Gacy's Sister on the Serial Killer's Last Day | The Oprah Winfrey Show | OWN (485,863 views)
- The death penalty by lethal injection and another the word say it (Amir arab Lulu Marjan, 5,757,733 views)
- 10 Shocking Last Meal Requests On Death Row (TheRichest, 7,307,073 views)
- Aileen Wuornos - Interview The Day Before Being Executed (Talk Horror, 1,459,075 views)
- Ted Bundy's Last Interview



## Development of Bones

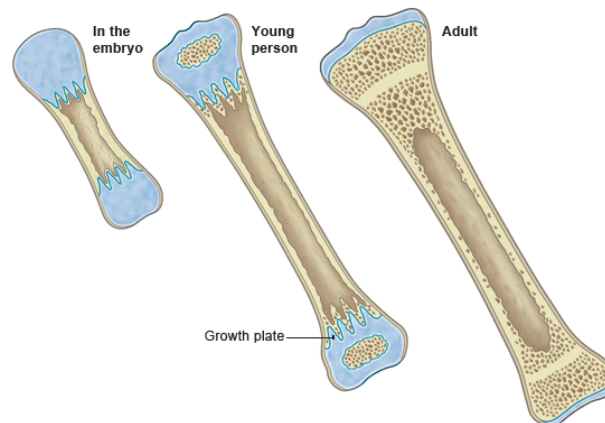
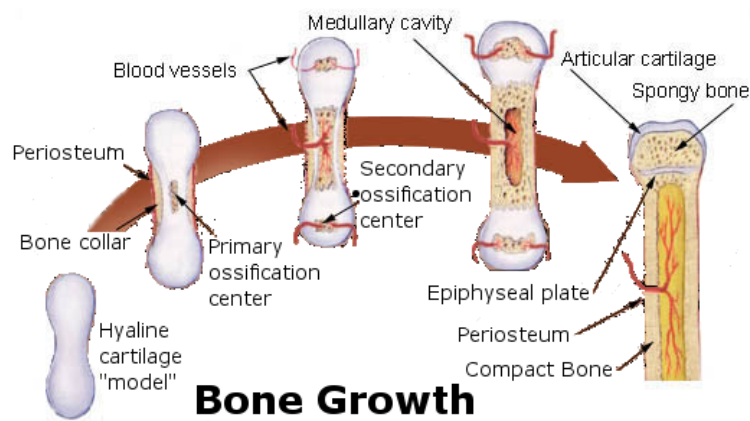
Bones are live and carry on life functions.

Bones originate from cells called osteoblasts.

They migrate to the center of cartilage production and deposit minerals.

Throughout life, bones are being broken down, deposited, and replaced.

Osteoclasts, the 2<sup>nd</sup> type of bone cell, among other tasks, remove cellular wastes.



## How Bones Are Connected

Bones are held together by:

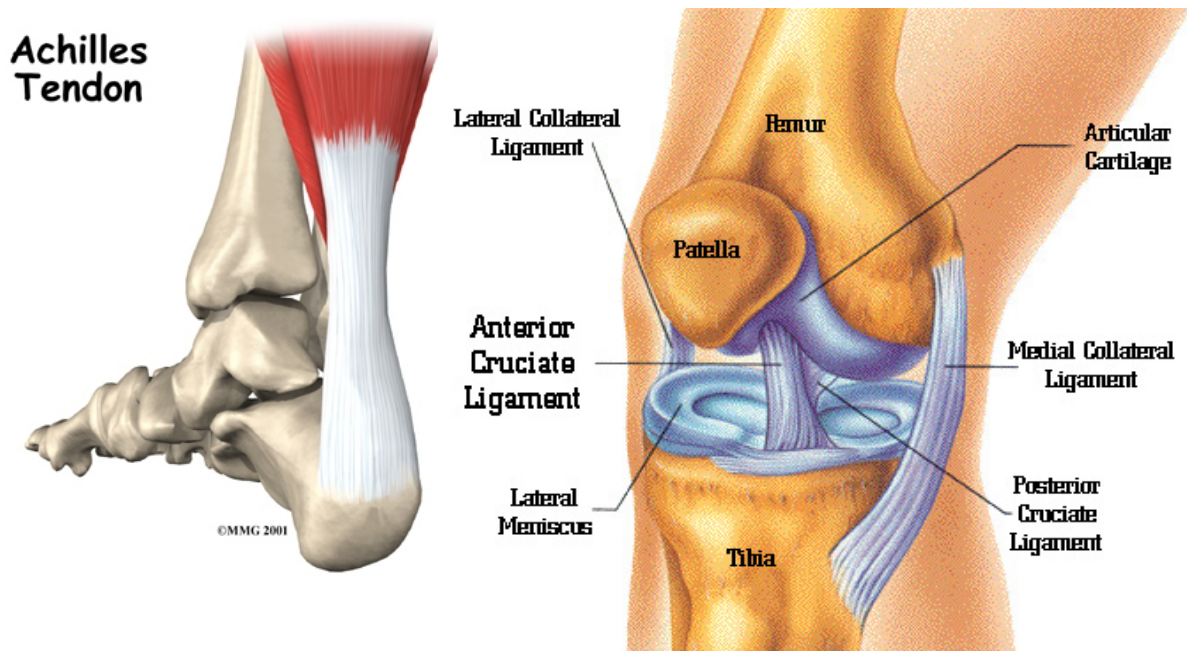
**cartilage**—wraps the ends of bones and keeps them from scraping one another.

**ligaments**—bands that connect two or more bones together.

**tendons**—connect muscle to bone.

Until about 30 years of age, bones increase in size.

Deterioration after 30 can be slowed with exercise.



## What Bones Can Tell Us

**Osteobiography** tells much about a person through the study of the skeleton.

The bones of a right-handed person right arm, for example, would be slightly larger than the bones of their left arm.

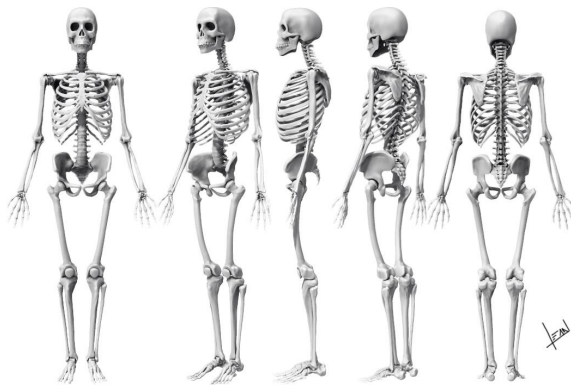
Forensic scientists realize that bones contain a record of the physical life.

The conditions of bones can tell investigators about a person's and nutrition during life.

Forensic anthropologists often determine if damage to bones occurred before or after death.

Definite distinctions exist between patterns on bones made by weapons and the patterns created by the environment after death.





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**FORENSIC ANTHROPOLOGISTS** analyze skeletal remains to determine the identity of a victim as well as his/her life history, cause of death, or other clues about a crime.

### **Main Characteristics:**



**Sex** - Determined by examining the skull, pelvis, humerus, and femur.

**Age and Stature** (height/build) - Determined by analyzing the development of teeth, bone growth, cranial suture lines, and the length of specific bones, such as the femur.



**Race** - Determined by analyzing the skull for characteristics that are common among people of different races.

## Sex Determination via SKULL:




Bones	Male	Female
Mandible		
Eye Orbits		
Zygomatic Arch		
Ramus		
Nuchal Crest		
Frontal Bone		
Jaw Bone		



YouTube <sup>CA</sup> Search  


**Male Female Skull Comparison**


 Jan-Petrina Puhl  37

17,534 views

 Add to  Share  More

 117  7

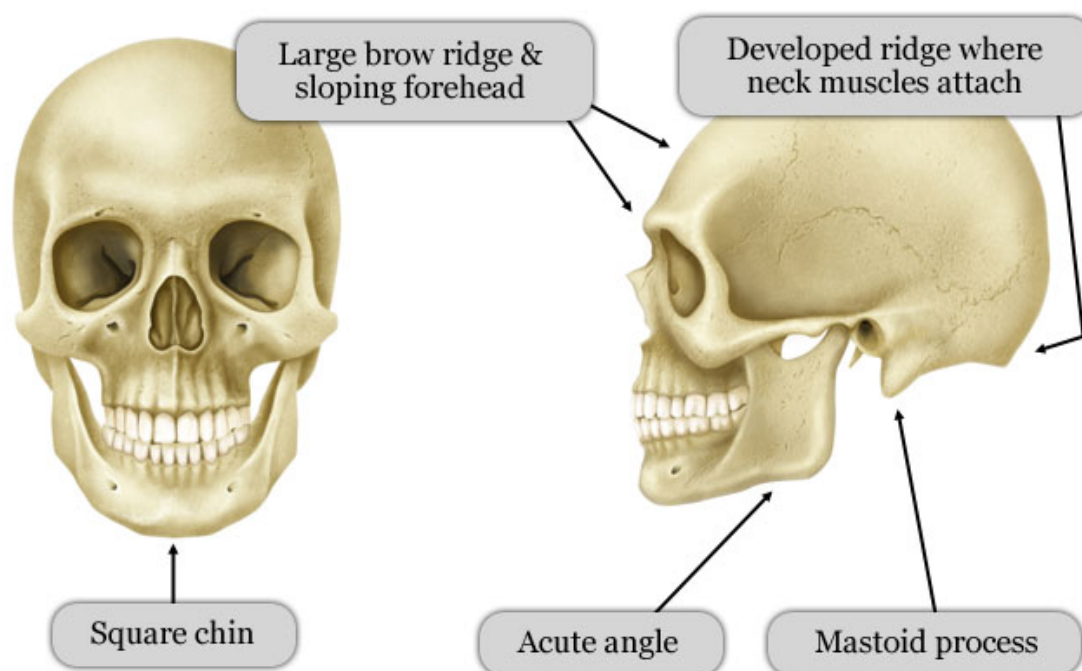
Up next 

 **female vs male pelvis.wmv**  
Ren Hartung  
37,814 views

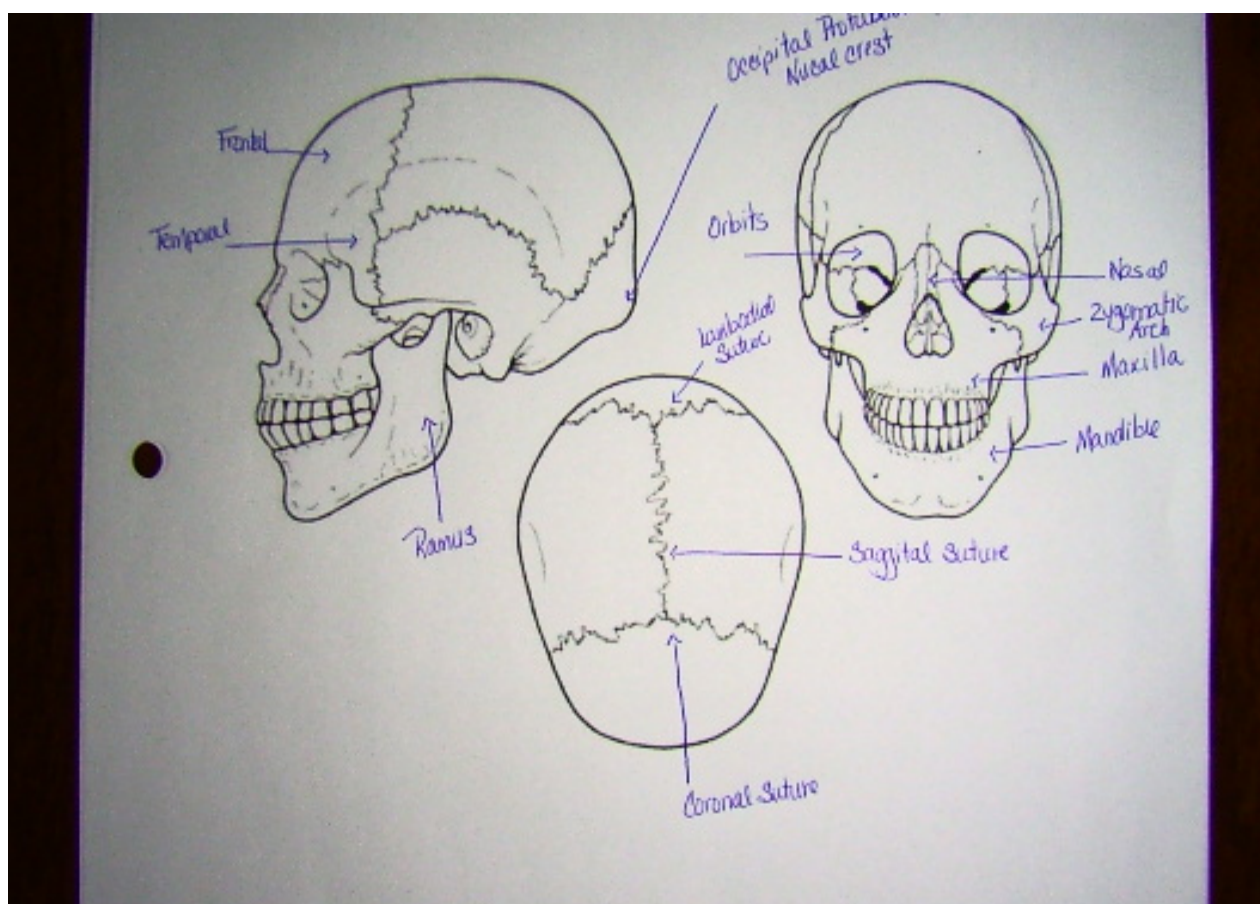
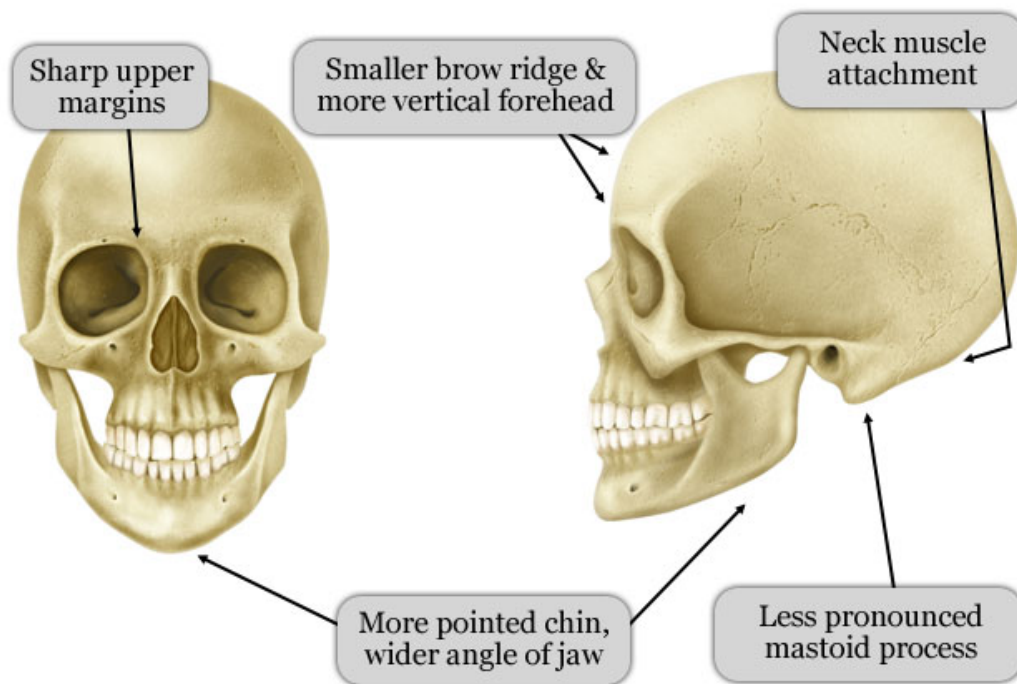
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## Male



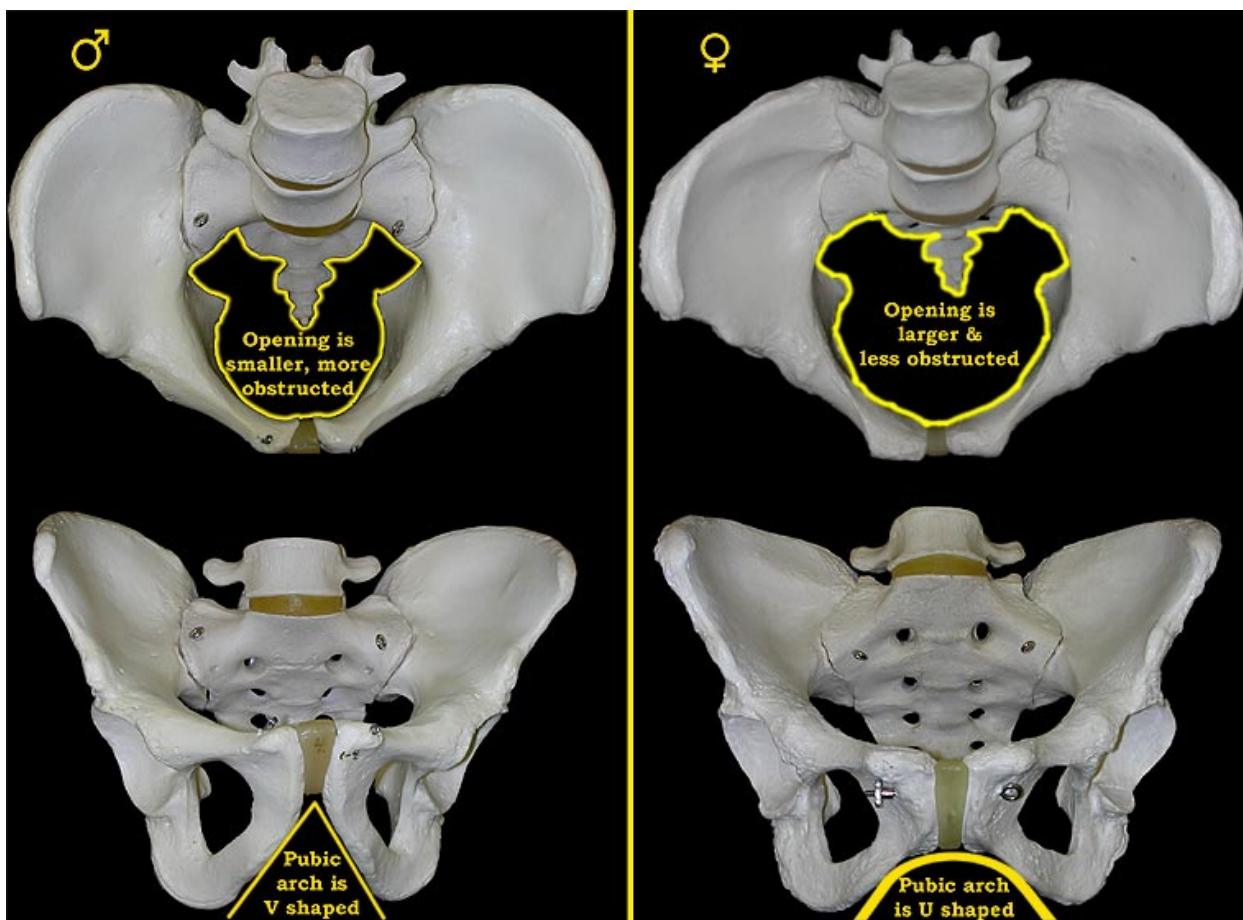
# Female



**Sex Determination via PELVIS:**

<b>Bones</b>	<b>Male</b>	<b>Female</b>
<b>Iliac Crest</b>		
<b>Pelvic Inlet</b>		
<b>Pelvic Outlet</b>		
<b>Pubic Arch</b>		

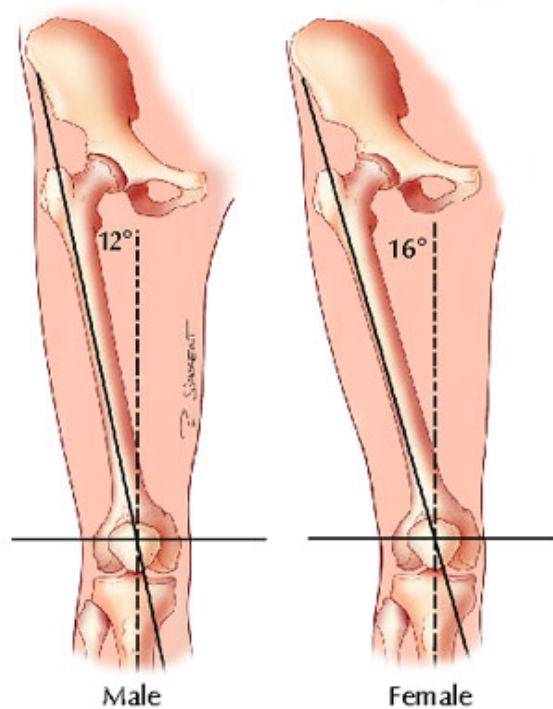




### Sex Determination via FEMUR:

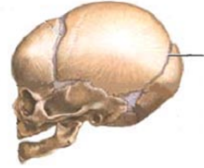
The angle of the femur in relation to the pelvis in females is greater than that of the males. Males also have a thicker femur than females do.

Comparison of male and female Q angles



## Age

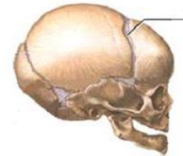
By about age 30, the suture at the back of the skull will close.



By about age 32, the suture running across the top of the skull, back to front, will have closed.



By about age 50, the suture running side to side over the top of the skull, near the front, will have closed.



At birth, we are born with ~ 300 bones which fuse together to form 206 bones as we become adults.

As the cartilage between the bones is replaced, an epiphysis line is visible.

When the cartilage is fully replaced, the line is no longer visible.

This information can be used to approximate a skeleton's age.

## Stature

Just as age can be estimated by looking at the bones of the arm and leg, so also can an estimate of height be made.

Often, the approximate height of a person can be calculated from one of the long bones, even if just one is found.

Gender and race will need to be taken into consideration in making the estimate.

Attachments

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