

# ЗМІСТ

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# Foreword

**Jacob Hankinson**

**Artist & instructor**

**Artwork © Jacob Hankinson**

The elements that help to forge a work of figurative art are dizzying. Contour, form, gesture, planes, and design (to name just a few) all play vital roles in creating believable and aesthetically pleasing figures, and yet these alone are not enough to ensure that a work of art will be successful. As an instructor, I frequently see artwork with flowing gesture, well-constructed form, and sharp designs that fall short of their potential — or worse, fall completely flat. These otherwise beautiful drawings are marred by one crucial missing element, an element that both the beginner and experienced draftsman have an unfortunate tendency to overlook. What is this Achilles' heel that causes so many artists to stumble? It is, in fact, the heel itself and all the muscle, sinew, and bone that connect us.

Anatomy is much more than simply memorizing the names and locations of our various parts. It is a way of understanding how we move through the world, a way of perceiving the people around us with a new perspective and sense of wonder. It is a way of looking at a person and being able to recognize every bump, line, and protrusion, and how each one helps us to function. It is a way of

using knowledge — not of art, but of ourselves — to breathe life into our work and imbue it with a soul.

Knowledge of human anatomy is essential not only to those striving for realism, but to those whose work requires imagination and invention. It is what divides the amateur from the professional, and the professional from the master. Any number of common errors — hands without discernible wrists, misshapen rib cages, deformed feet, and lumpy legs — can be ascribed to a lack of anatomical knowledge. The difference between drawing a knee that looks believable and a knee that looks like it met with an accident is a simple matter of knowing the bones and their functions; further study will allow an artist to move beyond creating figures that look merely believable to creating figures that appear ready to leap off the page. Of course, anatomy alone isn't a panacea, but combined with diligent study and practice of the core principles of art, it can remedy many of the issues that plague aspiring and professional artists alike.

Having access to high-quality learning materials is critical to an artist's success; after all, we can only learn as well as we are taught. When it comes to anatomy, it is important that the text both clearly explains and clearly shows the forms, functions, and myriad varieties of the human figure — male and female, young and old, stocky and athletic, and everything in between. This book wonderfully distills those complexities into a visually pleasing and easy-to-follow guide. As both a student and teacher, I have amassed a large collection of anatomy books and can safely say that this is among the best I have seen. Not only does it cover joint mechanics, body types, and asymmetry, but it contains a wealth of images and illustrations to learn from as well. I certainly wish I had owned a copy when I was an aspiring artist struggling to teach myself how to draw, and I am sure that this book will be one you reach for again and again in your studies.





# Introduction

## ■ HISTORY OF ANATOMY

As visual artists, our aim is to create images that are emotive and believable, whether these are photo-real or stylized, 2D or 3D, still or moving. Further to this, and especially when working on character-based designs, we want to sell the idea that the character on the page or screen is a living, breathing entity. Both 2D and 3D artists need to show that their character has structure, shape, and form to create an illusion that the marks on the page or the vertices on screen have an underlying skeleton to support the body and muscles to drive motion. Audiences are consciously, or subconsciously, aware when things look and move unnaturally. They may not know why, but as soon as there is some doubt in their mind about credibility, the illusion is broken.

Before studying the skeleton, muscles, and tendons of the human form, it is interesting to look back through history to see how our knowledge of anatomy has evolved over time.

Translated from the Greek word *anatomē*, meaning “dissection,” anatomy is the study of all things living, from human to animal to plant. It is unclear as to when the first studies of the human form were carried out, but there is evidence to suggest anatomical examination predates the mummification practices of the Ancient Egyptians.

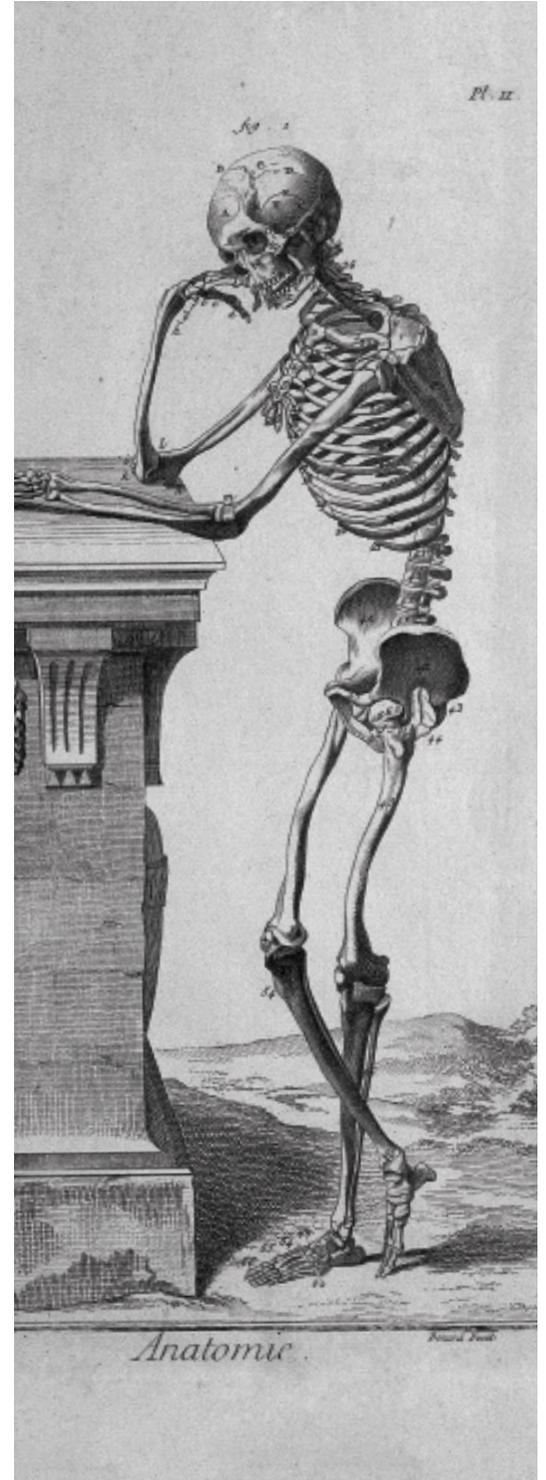
The Greeks continued mankind’s fascination with the human form, but many had to restrict their practices to the dissection of animals as it was soon forbidden to use human subjects. Unsurprisingly, this resulted in many strange theories. During this period, Hippocrates (c. 460–370 BCE), known as the Father of Medicine, developed the Hippocratic Oath, a pledge to practice medicine honestly, which is still used by physicians today. Herophilus (c. 335–280 BCE) was another scientist who, along with Hippocrates, became a founder of anatomy. Herophilus was known as the Father of Anatomy and many see him as the greatest anatomist of

the ancient times, challenged only by Vesalius in the 16th century.

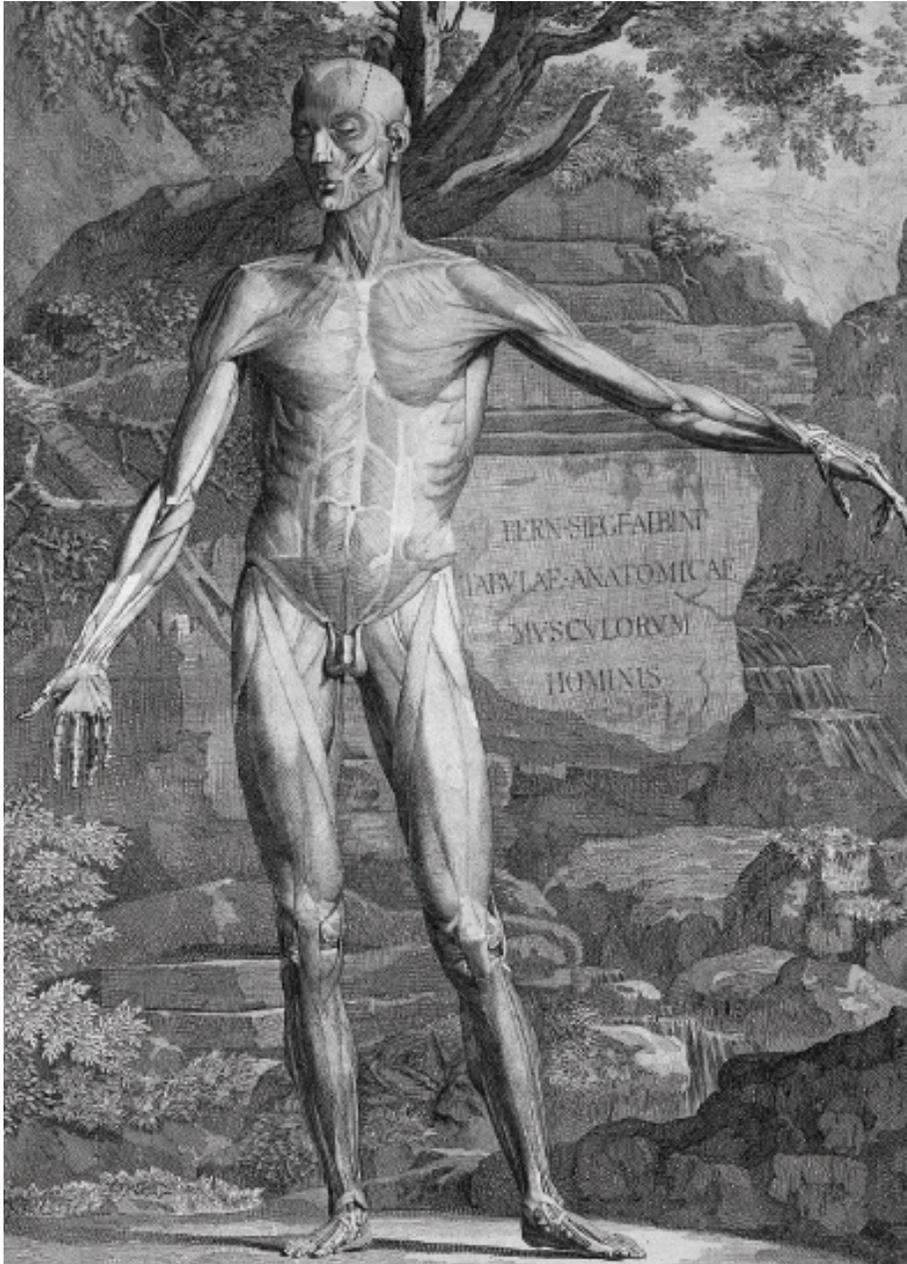
During the Roman Empire, the theories and practices of Galen (c. 130-210) gained much attention and would dominate medical science for centuries to come. His experience ranged from treating gladiator wounds to becoming the personal physician to many emperors. His dissection of animals, including pigs and macaque monkeys, led to understandings that still hold up today, such as the formation of urine in the kidney and the workings of the peripheral nervous systems.

The next major period of development came during the Renaissance movement. Leonardo da Vinci (1452–1519) dedicated part of his life to the anatomical study of the human form, animals, and plants. His studies filled sixty notepads and he produced over 500 diagrams. He was the first to create a scientific diagram of the fetus *in utero* and his skills, not only as an artist but an engineer, pushed him to understand the mechanics of human movement and what we now call biomechanics. Da Vinci’s research led to what has been referred to as the first robot in human form: Leonardo’s Robot (1495). By viewing the human body as a kind of machine, he was able to replicate this through the use of levers and pulleys to make his robot sit, stand, and move its arms.

In 1543, Andreas Vesalius (1514–1564), who many would call the Father of Modern Anatomy, released *De Humani Corporis Fabrica Libri Septem* (*On the Fabric of the Human Body in Seven Books*). Based on his Paduan lecture series, the book was a visual tour de force of the human body. Through a collection of highly detailed illustrations based on human dissections, Vesalius was able to correct the majority of misconceptions that had been passed down from the age of Galen. Though Galen’s research was derived from the dissection of animals, Vesalius’ attempts to state the now obvious were not met favorably by the



Lateral view of a human skeleton, leaning against a tomb, after Vesalius. Engraving by Benard, late 18th century, after a woodcut, 1543.

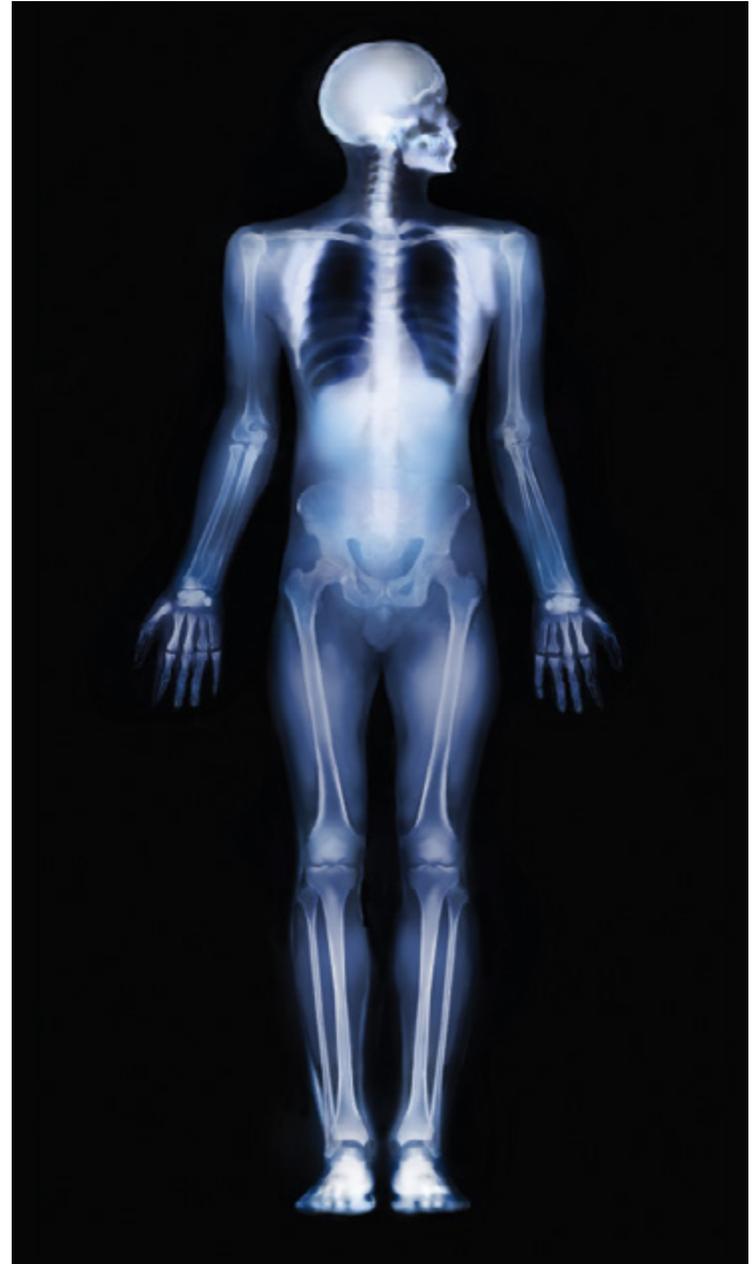


From *Tables of the skeleton and muscles of the human body*, 1749. Bernhard Siegfried Albinus, 1697-1770.

establishment of the time. Nevertheless, through his dissections of the human body and its organs he was able to shed new light on anatomy.

Moving on to the 17th century and beyond, William Harvey's (1578-1657) *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus* (*An Anatomical Exercise on the Motion of the*

*Heart and Blood in Animals*) solved the puzzle of blood circulation which Vesalius had been unable to achieve. Additionally, Bernhard Siegfried Albinus' (1697-1770) *Tabulae Sceleti et Musculorum Corporis Humani* (*Tables of the Skeleton and Muscles of the Human Body*) increased scientific accuracy through the techniques employed to illustrate the dissected



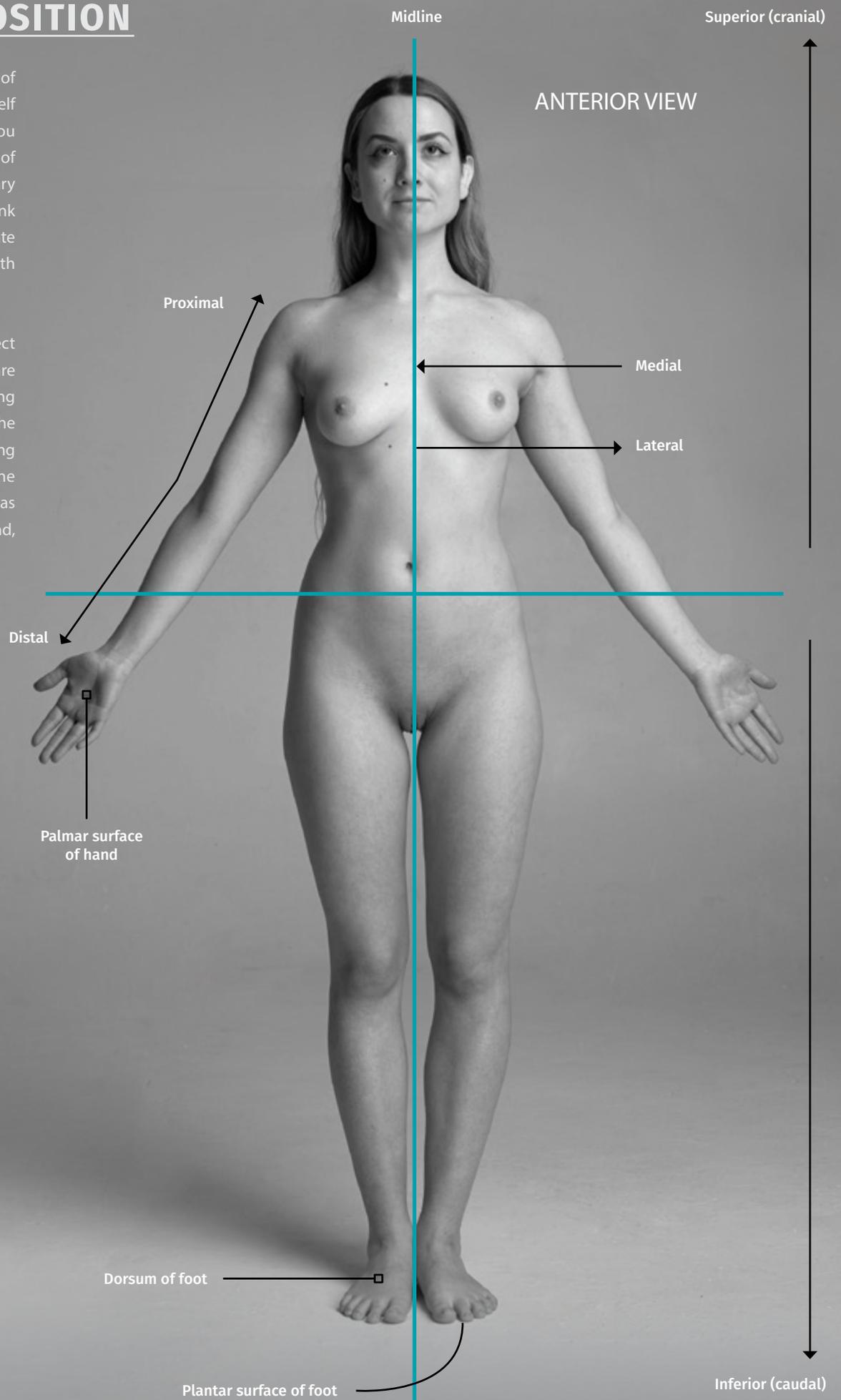
X-ray of the human body, an illustration by Charlie Pickard.

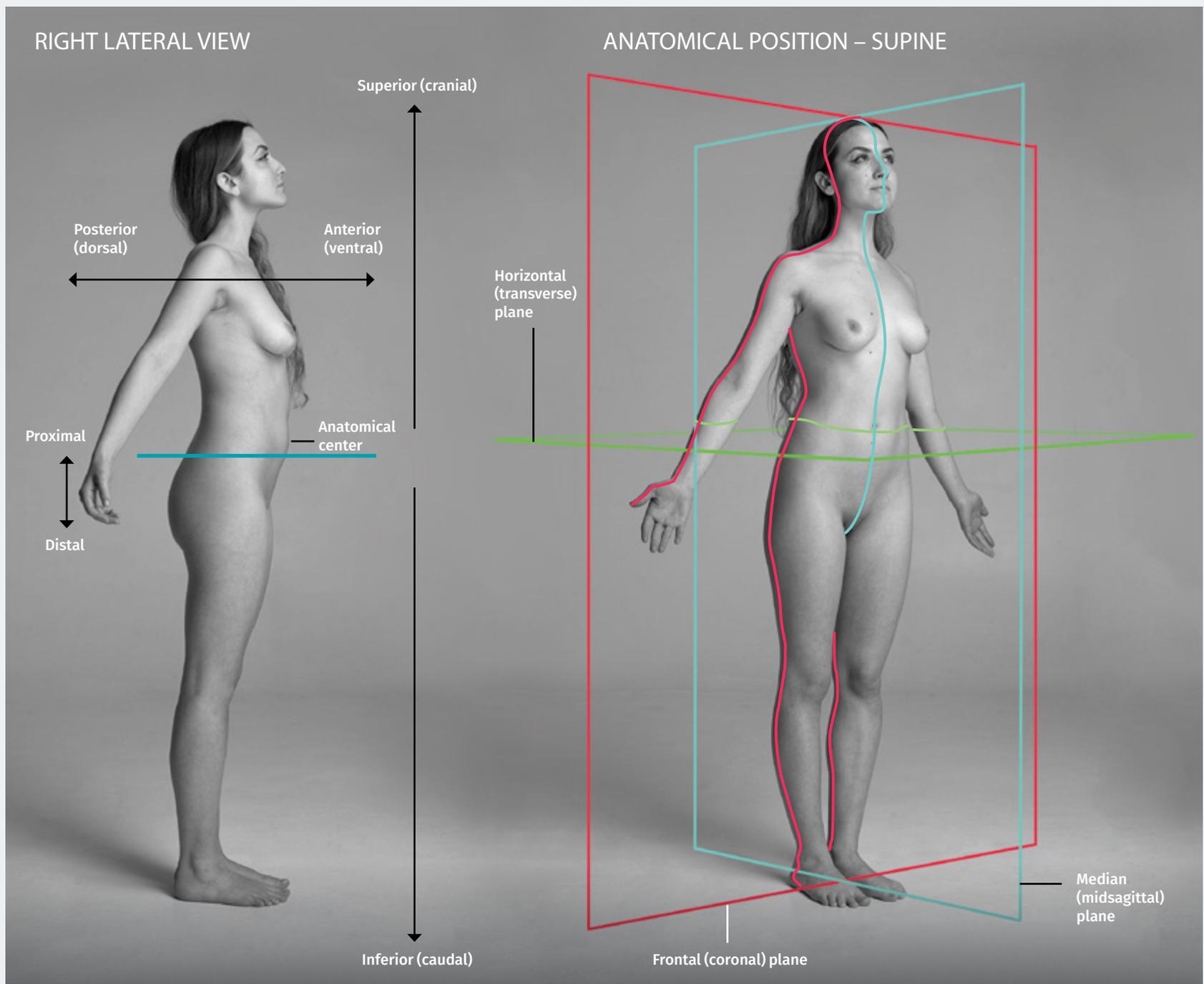
body. Anatomists such as Henry Gray (1827-1861) followed, leading to modern times where advances in technology, such as MRI scans and X-rays, allowed for an ever deeper understanding of the human construction.

# THE ANATOMICAL POSITION

Before delving into the skeleton and muscles of the body, it is important to familiarize yourself with the anatomical position. This will allow you to understand the orientation and position of the different body parts through the vocabulary commonly used in reference to anatomy. Think of the anatomical position as the coordinate system for a map; once you figure out your north from your south, it is easier to get from A to B.

In the anatomical position, the body is erect with the head facing forward. The feet are around six inches apart and the toes are facing forward. The arms are down to the side with the palms facing forward and the thumbs pointing outward. This is also known as the supine anatomical position, whereas if the body was lying on its back with palms flat on the ground, it would be in the prone anatomical position.





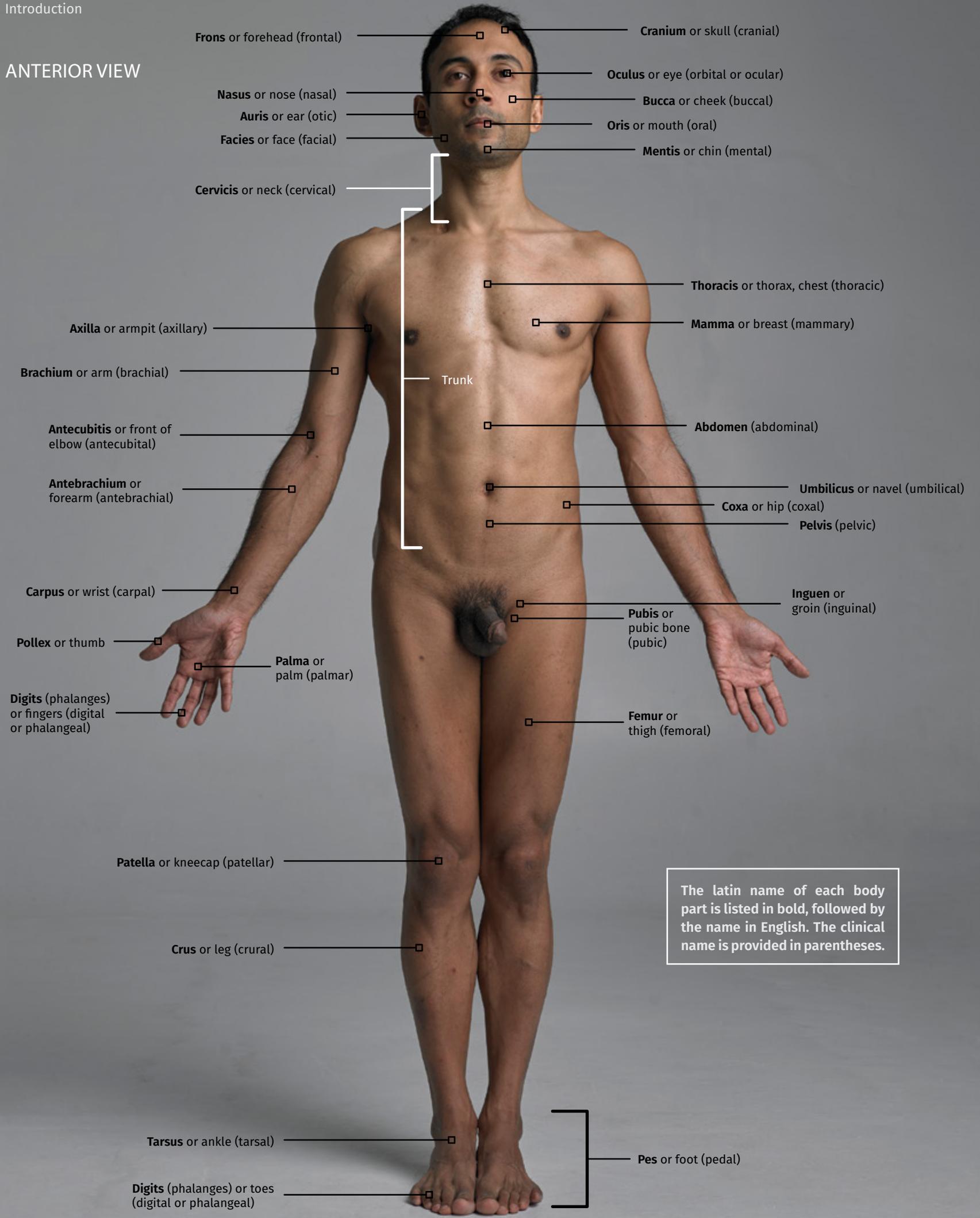
Here is a list of terms related to the anatomical position:

- **Frontal (coronal) plane:** This plane divides the body into front and back portions.
- **Horizontal (transverse) plane:** This is a horizontal plane that runs perpendicular to both the frontal and the median planes.
- **Median (midsagittal) plane:** This plane divides the body into equal right and left halves.
- **Posterior (dorsal):** Toward the back.
- **Anterior (ventral):** Toward the front.
- **Superior (cranial):** Toward the head.
- **Inferior (caudal):** Toward the feet.
- **Proximal:** Near the trunk.
- **Distal:** Away from the trunk.
- **Medial:** Toward the median plane (near the middle of the body).
- **Lateral:** Away from the median plane (away from the middle of the body).
- **Anatomical center:** The point on the body where the frontal, horizontal, and median planes meet so that parts of the body can be referred to as anterior or posterior, or superior or inferior (for example) of this point.

For example:

- The spine is at the posterior (dorsal) side of the body.
- The humerus is lateral (to the side away from the median plane) of the sternum.

# ANTERIOR VIEW



The latin name of each body part is listed in bold, followed by the name in English. The clinical name is provided in parentheses.

POSTERIOR VIEW

