

ANATOMY OF THE GUITAR

History

The classical guitar, or Spanish Guitar, is an acoustic instrument made of wood, with six nylon strings. Antonio de Torres, a Spanish guitarist, and luthier, was the most important Spanish guitar maker of the late 19th century. Most modern guitars in use today are derivatives of his designs.

Headstock and Tuners

The headstock is located at the end of the guitar neck farthest from the body. The headstock has tuners that adjust the tension of the strings, which in turn affects the pitch. Turning the pegs clockwise will lower the pitch of the string. Turning the pegs counter clockwise will raise the pitch of the string. The tuning pegs furthest from the body of the guitar tune the middle strings - strings 3 & 4. The tuners closest to the body of the guitar tune the outer strings - 1+6.

Nut

The nut of the guitar is a small strip of bone, or other hard material, found at the point where the headstock meets the neck. Its grooves guide the strings onto the fretboard, giving consistent lateral string placement. It is one of the endpoints of the strings' vibrating length.

Fretboard

The fretboard is a piece of wood embedded with metal frets that comprises the top of the neck. The fretboard is flat on classical guitars and slightly curved on acoustic and electric guitars. Fretboards are most commonly made of rosewood, ebony, and maple.

Frets

The frets are the metal strips (usually stainless steel) embedded along the fretboard at exact points in accordance with a specific mathematical formula. Pressing a string against a fret determines the strings' vibrating length and therefore its pitch. The pitch of each consecutive fret is a half-step interval and the distance between the frets gets small as you move up the neck of the guitar. Standard classical guitars have 19 frets and the twelfth fret divides the string exactly into two halves.

Neck

A guitar's frets, fretboard, tuners, headstock, all attached to a long wooden extension, this is the neck of the guitar. The wood used to make the fretboard usually differs from the wood in the rest of the neck. The shape of the neck can also vary, from a gentle "C" curve to a more pronounced "V" curve.

Strings

The guitar has six strings numbered from lowest (closest to the ceiling when in playing position) to highest sounding (closest to the floor when in playing position) 6, 5, 4, 3, 2, 1. From lowest to highest the strings correspond to the letter names E, A, D, G, B, E. The three high pitched strings were originally

made from sheep or cow intestine, while the three bass strings are made of a silk thread core wound with gut. Since the development of nylon guitar strings, by Albert Augustine the three treble strings are a single nylon filament, while the three bass strings are made of a core of fine nylon threadlike filaments wound with silver plated bronze or copper wire. Please devise an acronym to remember the letters names of the strings.

Scale

The "scale", or string length is the maximum vibrating length of a string and determines the range of tones that string can produce. The typical classical guitar has a scale of 650 mm.

Tuning

There are a number of free apps which can be downloaded onto smart phones which allow you to tune your instrument. Guitar Tuna might seem to be the best one on the market presently. Please make sure you have it downloaded on your phone and begin to tune your guitar with it.

Body

The body of the guitar is a major determinant in the overall sound quality and consists of several parts.

Upper Bout

Is the smaller rounded part of the body closest to the fretboard.

Lower Bout

Is the larger rounded part of the body which is furthest from the fretboard. Waist Is the curved area located between the upper and lower bouts.

Bridge

The Bridge holds the strings in place on the body. The main purpose of the bridge is to transfer the vibration from the strings to the soundboard, which vibrates the air inside of the guitar, thereby amplifying the sound produced by the strings.

Saddle

The saddle of a guitar refers to the part of the bridge that physically supports the strings. It is typically one piece on acoustic guitars. The saddle's basic purpose is to provide the end point for the string's vibration at the correct location for proper intonation, and to transfer the vibrations through the bridge into the soundboard of the guitar. Saddles are typically made of plastic or bone.

Soundboard

The guitar top, or soundboard, is a finely crafted and engineered element made of spruce or cedar. This thin piece of wood is often only 2 or 3 mm thick. The soundboard is the dominant factor in determining

the sound quality of an instrument. The majority of the instrument's sound is heard through the vibration of the guitar top as the energy of the vibrating strings is transferred to it. Check out Willie Nelson guitar "Trigger" for a soundboard that has been well used.

Sound Hole

The body of an acoustic guitar has a hole through which sound projects. This is usually a round hole in the sound board of the guitar, directly under the strings. Air inside the body vibrates as the guitar top and body is vibrated by the strings, and the response of the air cavity at different frequencies.

Rosette

The decorative display around the sound hole. Builders traditionally inlay this with fancy roses. This part of the guitar often highlights the builder's personal artistic style.

THE FOUR PRINCIPLES OF EFFICIENT MUSCLE FUNCTION

The four principles of efficient muscle function are as follows.

1 Muscular alignment:

Muscles function most efficiently only when naturally aligned with their base and joint attachments. Natural alignment provides the most direct pull of the muscles that control your back, wrist, and finger joints. Notice this principle at work the next time you pick up your guitar case.

2 Mid-range function of joints:

Muscles function most efficiently only when the joints they control are operated within their midrange of movement. Midrange positioning and movement provides optimum leverage to the muscles involved. Notice this principle at work the next time you pick up your favorite beverage. These first two principles refer specifically to positioning of the body whereas the last two principles refer to the movement of the body.

3 Uniform direction of joint movement:

Muscles function most efficiently only when all three joints of a finger or the thumb are either flexed or extended together, in contrast to flexing one joint while extending another. Simultaneous extension or flexion simplifies coordination of the muscles. This motion can best be illustrated by simply scratching your arm.

4 Follow-through:

Muscles function most efficiently only when there is sufficient follow through to avoid a build-up of counterproductive tension. Sufficient follow-through means that, once a movement has been initiated, no intentional restraint is applied to the movement. This principle can be seen in action during a golf swing, or a slap shot in hockey. (Shearer, pg.10)

Conclusion - When playing the guitar, you can't always fully conform to these principles. You can, however, establish a basic technique that takes advantage of the movements and positions that cause the least counterproductive tension. Thus, the Principles of Efficient Muscle Function give you objective standards for recognizing these positions and movements.

THE SEATING POSITION

Positioning the guitar is the foundation of your technical development. You need to establish a position that is effective and enables you to avoid counterproductive tension. Your general aim is to hold the guitar in the most effective, comfortable, and secure position, providing free access to the strings and to the full range of the guitar.

The chair: To begin with, bring your bottom forward to the edge of the chair on which you are seated. This will allow your legs freedom of movement and will also allow for better circulation of blood. In proper playing position the lower bout of the guitar will often be lower than that of the seat of the chair.

Left leg

The left leg should extend directly from the hip and should be parallel with the upper torso. It is the foundational support that the guitar rests on.

Right leg

The right leg and foot should extend approximately 45 degrees to the right. The tibia should be at a right angle to the floor.

Spine

For your position to be comfortable, your back muscles should be in alignment. Imagine that you have a string attached to the top of your head that is pulling gently upwards. Think tall and allow your spine to elongate toward the ceiling.

Shoulders

Your shoulders should be relaxed and symmetrical.

Footrest

Place the footrest directly in front of the left leg and place the left foot on the footrest. Your Tibia should be at right angle to the floor and your femur should be at least parallel to the floor - preferably, it should be on a slight upward incline away from the body. This will ensure that the guitar does not slide off of the leg.

FOUR POINTS OF CONTACT

Now we will introduce the guitar into the seating position. In proper playing position the guitar will contact the body at 4 points.

- 1) The waist of the guitar rests on the **left inner thigh**.
- 2) the lower bout of the guitar will contact the **right inner thigh**.
- 3) the back rim of the upper bout will rest on the sternum or the **chest bone**.
- 4) the most important point of contact will be with **right forearm**.

The right forearm will hold the guitar in place and will rest midway between the wrist and the elbow on the front rim of the lower bout of the guitar. Picture an imaginary line proceeding upward from the bridge; this is approximately where the forearm should be placed. Those with larger limbs will be further away from the sound hole; those with shorter limbs the position will be closer to the sound hole. This is the basic positioning for playing the guitar.

TERMS & SYMBOLS

Right hand fingers

When reading a musical score, right hand fingers and thumb are always identified by the first letter of their Spanish name. The thumb (pulgar) is indicated by the letter P, index (indice) by the letter I, middle finger (medio) by the letter M, ring finger (annular) by the letter A and the small finger (chico) is identified by the letter C. Thus, you will notice the letters P, I, M, A, C throughout musical scores to indicate right hand fingering.

Midway position

When referring to the midway position of a joint, we mean the approximate midpoint between the comfortable limits of flexion and extension. Imagine picking up a can of your favorite beverage. The fingers will most likely be in their comfortable mid-way position when doing so.

Midrange movement

When referring to the midrange movement of a joint, we mean approximately the middle two quarters of the range between the comfortable limits of flexion and extension.

Arch

When referring to arch we mean the result of flexion at your wrist joint.

Alignment

When referring to alignment, we mean the alignment of your wrist with your hand and forearm.

Deviation

When referring to deviation we mean the sideways curvature of your wrist to either the right or left.

Tilt

When referring to the tilt of your hand we mean the orientation of your hand and fingers to the strings, resulting from the counterclockwise rotation of your forearm. These terms are important for understanding how to position your body when playing guitar.

RIGHT HAND POSITIONING

It's difficult to overemphasize the importance of right-hand positioning. It directly affects your development and coordination. When learning to position your right hand your aims are as follows. Your aims are as follows

- 1 To position your wrist according to the principle of muscular alignment
- 2 To position the knuckles and middle joints of your fingers in their midway position
- 3 To establish the most effective tilt of your hand. (Shearer, pg. 35)

Alignment

To position your wrist, do the following. Align the side of the I knuckle with the side of your wrist and forearm. Notice that this aligns the m knuckle with the center of your wrist and forearm, and the A knuckle with its side of the wrist and forearm.

Midway position of wrist and knuckles

Now you need to determine the midway position of your wrist and knuckle joints: To do so hold your right hand away from the guitar. Relax your finger joints as much as possible. Flex and extend your wrist to its comfortable limits. Notice that, when your wrist is fully flexed, your fingers become almost completely extended; and, when your wrist is fully extended, your fingers become almost completely flexed. Now, arch your wrist in its midway position, so that your finger joints also assume their comfortable midway position. Now place your forearm in playing position, midway between the wrist and the elbow and above the bridge. Place P on 3 outside the sound hole and just above the rosette, I on 2, and M on 1. In proper playing the position of the middle knuckle of each finger should be directly above the string on which it rests. There should be enough room to allow for 3 fingers to go between the guitar and your wrist.

Tilt of the hand

With your wrist aligned, and your wrist and knuckles in their mid-range position, place p on 4, I on 3, M on 2 and A on 1. Now tilt your hand counter clockwise by slightly rotating your forearm. Do this until the tip and middle segments of A are approximately vertical to the plane of the soundboard. With the A finger vertical to the soundboard you will notice that the tip and middle segments of M finger will be slightly tilted to the left, and those of I finger even more so to the left. This is done to accommodate for the difference in size of fingers. (Sheare.pg. 35)

Point of contact

The point of contact (POC) is the place where the plucking hand finger meets the string. The finger should contact the string on the left side of the nail exactly where the flesh and nail meet. Press your finger into the string for several seconds then look at the indents in your fingertips. This is the place where you should always play from. Professional guitarists use nails to create a loud dynamic, a refined tone and for greater articulation, if you have them please use them.

Finger to string assignment (or “fixed finger positioning”)

For the first 2 levels of this course we will be using a strict fixed finger right hand position in which each finger is assigned a to a specific string. This “finger to string assignment” will be indicated at the beginning of each piece or exercise and will provided security and predictability for the right hand. Sometimes the thumb will be placed on string 4, and at other times P will be placed on string 3.

RIGHT HAND MOVEMENT

Right-hand movement involves two principles of efficient muscle function: Uniform Direction of Joint Movement and Follow Through.

Movement of p (“Pulgar” in Spanish, “Thumb” in English) finger

Now that your forearm is resting midway between the wrist and elbow above the bridge, your hand and forearm are aligned, your wrist and fingers in their midrange position and your hand slightly tilted counter clockwise, we are ready to play with p finger. Place P on 3 directly above the rosette, I on 2 and m on 1, now flex the tip and wrist joints together while keeping your hand and wrist steady. P finger should proceed in a downward direction and come to rest on the tip of I finger. Beware of making a circular motion with P, instead, extend and flex the thumb as directly as possible.

Movement of i (index) finger

We will now talk about the movement of I finger. Place your fingers on the guitar using a finger to string assignment with P on 3. With the finger contacting the string where the nail and the flesh meet, flex I finger and follow through, past the thumb, and into the palm of the hand. Follow through far enough so that you touch the palm of your hand. When flexing, the fingers should proceed in a straight line towards the elbow so that the tendons do not have to go around a corner. The finger should strike the string on an oblique angle - “sidewise” along the string. Striking the string at this angle will activate the mid-range frequencies of the string and create a full-bodied, mellow tone.

Movement of m (middle) finger

Now we are going to talk about the movement of M finger. Hold your right hand up and away from the guitar and make an L with your thumb and index fingers. While maintaining the L, wave your other three fingers. Now place your fingers on the strings using a fixed finger position with P on 3. Flex m finger from the large knuckle, past I finger and into the palm of the hand. Similar to the waving exercise, the inactive fingers - A (anular or “ring” finger) and C (“chico” or small finger), should also follow through into the palm of the hand in sympathetic movement with M finger.

LEFT HAND TRAINING

Although the right and left hand perform different movements when playing the guitar both function according to the same muscular principles. When beginning left hand study your aims are as follows.

- 1) To maintain the natural alignment of the wrist and forearm.
- 2) To position your wrist and finger joints within their midrange of movement and your forearm within its midrange of rotation.

Thumb positioning

The left hand thumb should be placed vertically, going “up and down” in the center, or upper 1/3, of the back of the neck directly opposite fingers 1 and 2. The thumb has two important functions.

- 1 To provide balance and stability to the hand.
- 2 To add pressure when fretting through flexion.

Be sure to apply the minimum pressure needed to produce a clear tone when fretting. Avoid unnecessary tension in your left hand and forearm.

The fingers – We use the letters of the alphabet to indicate right hand fingers when playing the guitar and numbers to indicate left hand fingers. Index finger is 1, middle finger 2, ring finger 3 and the small finger is 4. The left-hand thumb receives no number because it does not fret the guitar.

With your wrist in its mid-range position, the hand and forearm naturally aligned, and the forearm in its mid-range of rotation, the left-hand fingers will now be in their most advantageous position; extending lengthwise along the fingerboard. Similar to the right hand, the left-hand fingers will maintain a fixed finger to fret assignment—one finger per fret.

To begin fretting, carefully placing the tip of finger 1, just behind the first fret on string 1. Depress the string firmly through a balance of pressure between the thumb and finger. Alternately, sound the first finger and then the open string. Continue to do this using the finger 2 on fret 2, finger 3 on fret 3, and finger 4 on fret 4. Be sure to maintain a steady hand and do not let the tip joints collapse. When lifting the fingers from the frets, raise them only a minimum distance.