The S.M.A.C.K. Talk

A Fighter System

Section One: Biomechanics

Section One: The Human Biomechanics of Violence.

What is the ONE thing all forms of combat training have in common? Not the weapons…not the rules…not even the intent. **It's Humans.** All combat training/games/simulations use **HUMANS**. Therefore we need to actually discuss Humans and their abilities/limitations in a broad sense.

Human movement is in reality a complex system of 'levers and pulleys' working as counterbalanced forces. Here we will make a quick overview of the systems from an anatomical.

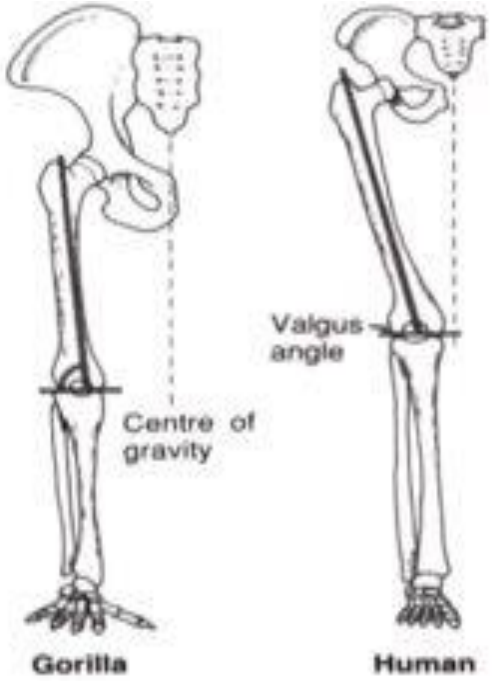
While our entire skeletal/muscle structure is interconnected, it can be 'separated' into two main groups/functions. Upper Body and Lower Body. We will start the discussion at the base, our Lower Body.

Section One/A: The Lower Body

The Human pelvis, femurs, and knees are markedly different than other mammals, including our cousin Apes, in no more noticeable way than their size and proportions. The Human pelvis is wider and shorter than other Apes, and our femurs are shaped differently, being angled to place the 'heads' of the femur closer to the centerline of the body when viewed both front-to-back as well as side-to-side.

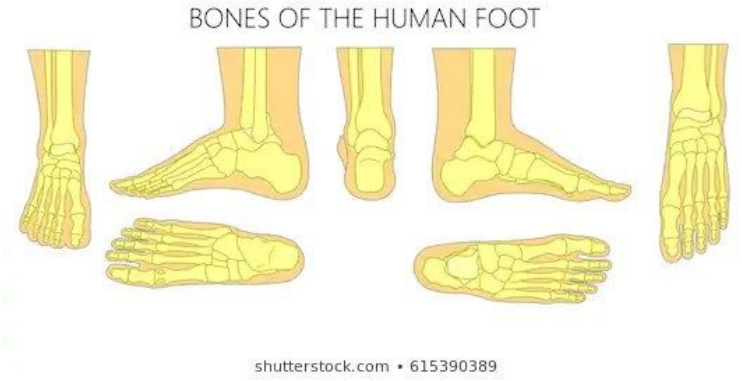
All this allows a mechanical system that not only aids the balance required for bipedalism, but also supports a upright spine perpendicular to the plane of the ground.

Special note: Yes, there is a marked difference in male/female pelvis structure and spine due to the sexual dimorphism of Humans, however for the most part it is negligible in the applications we are discussing and has less of an effect on Movements and Fight Mechanics than many think.



Foot Clan Rulez!

The Human Foot is worthy of special note, being unique in the Animal Kingdom, and is optimized for walking with the entire foot acting as both a shock-absorber and a spring return of energy back from the ‘ground strike’ due to raised arches of the metatarsal bones and ligaments. This is foundational to the Human Stride.

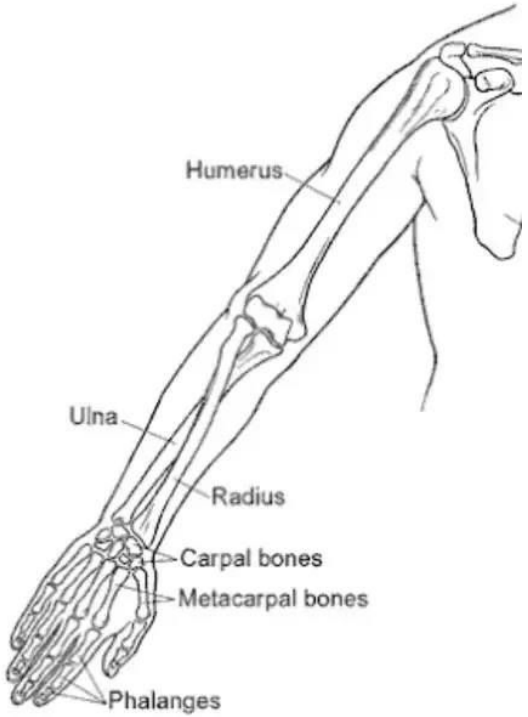


The Human Stride: The motion of our legs is coordinated so that one foot or the other is *always* in contact with the ground. This process of locomotion recovers approximately 60-75% of the energy used due to pendulum dynamics and ground reaction force.

Most terrestrial vertebrates can outrun us, especially quadrupeds,they are MUCH faster in the short term….however we as a species have mastered ‘walking’. *Nothing* out walks us.

Section One/B: The Upper Body

In Humans, The Upper Body has two distinct subsystems, The Arm and The Shoulder Girdle. First we will discuss the Human Arm.



The Arm: From the shoulder to wrist the Arm is made up of: Three long bones; The *Humerus*, *Ulna* and *Radius*. Of important note, of these bones only the Radius 'twists'. The Ulna remains fixed in place while the Radius rotates allowing the wrist to rotate.

Elbow Joints: You have **THREE** of those as well.
The Ulnohumeral: fixed joint between the Ulna and Humerus.

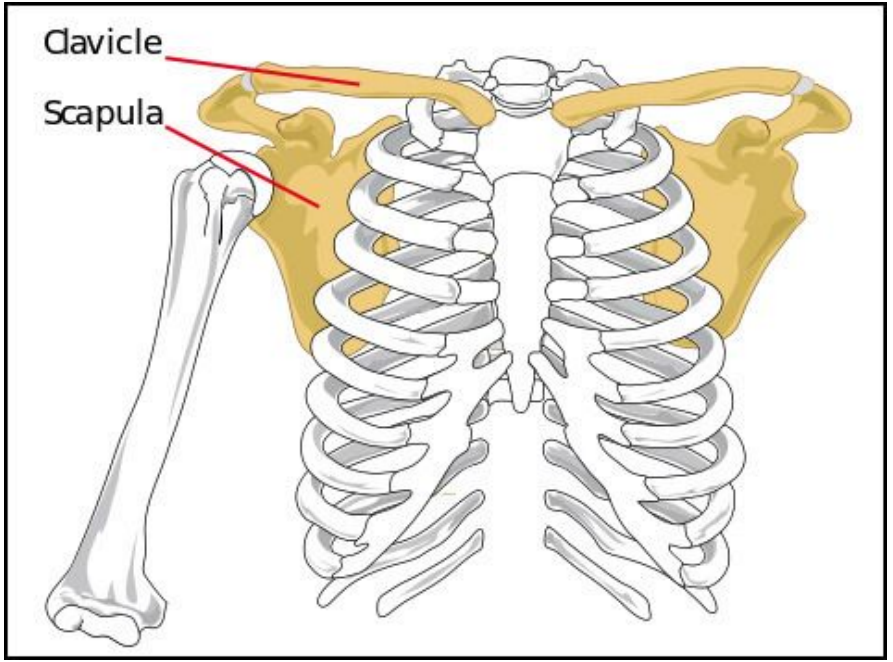
The Radiocapitellar: fixed joint between the Radius and Humerus.

The Proximal radioulnar: a bridge joint between the Radius and Ulna, which allows the 'twist' of wrist rotation.

Human Shoulder Girdle

The Human Shoulder joint is made up of only two bone groups, the Scapula and Clavicle.The Humerus is captured and supported in the Shoulder Girdle by fibrous tendons and muscle overlay(soft tissue), rather than a bone structure (osseous tissue).

The main muscle group aiding in the capture and stability is the Rotator Cuff group of 4 muscle structures. These muscles allow a wide Range of Motion(ROM).



This expanded ROM also makes the shoulder extremely unstable, and far more prone to dislocation and injury than other joints, especially compared to the pelvis.

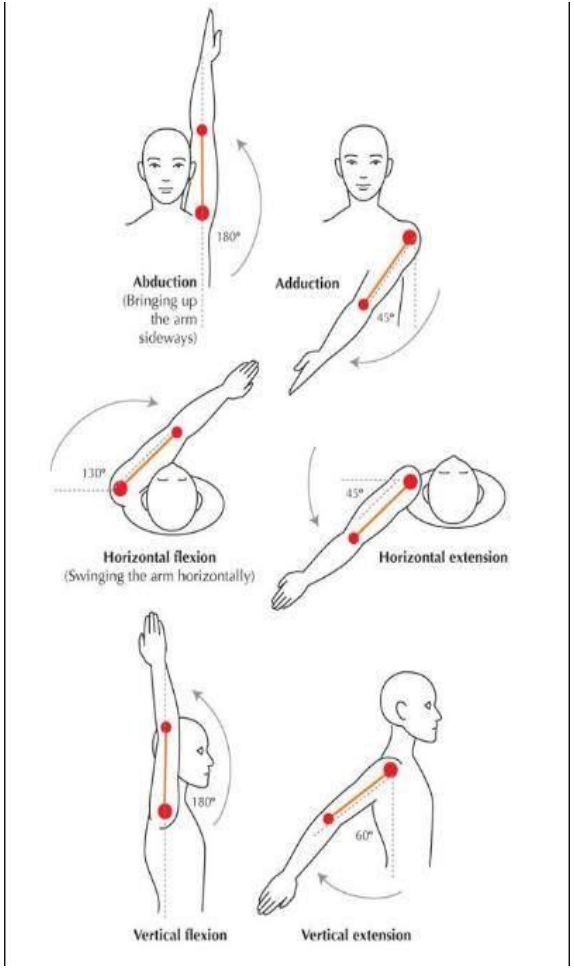
‘Overreaching’ or extending this ROM is the root cause of a number of injuries, both acute and repetitive motion based ones. Add to this the ‘stress’ of a weapon’s mass and we should accept working to limit our action to well within the limits of the ROM.

Shoulder ROM

Our ROM has overlaps of coverage but is focused in FRONT of us and on the midline of our torso, not above our heads or behind our shoulder.

While we can put our arms above our heads from the side(Abduction) to a limit of 180 degrees, doing so repeatedly places undue strain on the Shoulder Girdle that can lead to damage of associated tendons, bone, muscles, nerves, ligaments, and cartilage.

Study of sports injuries as well as repetitive motion occupational health data shows that limiting the ROM to adduction (rotation across the front of the body mid-line) and horizontal flexion(swinging froward from the horizontal plane of the shoulder) lessens stress on the shoulder girdle and reduces the chances of injury

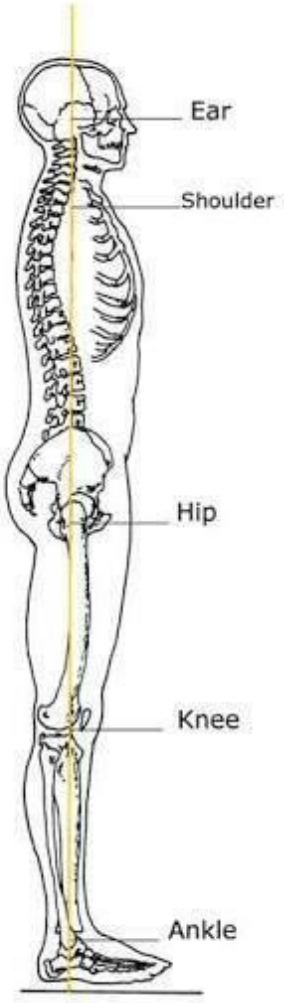


Section One/C: The Spine

For the purposes of this discussion, we will not go in great depth on the spinal-muscular system, other than to state that as the connecting ‘bridge’ between Upper and Lower Body it is the starting point for our stance construction and movement theory.

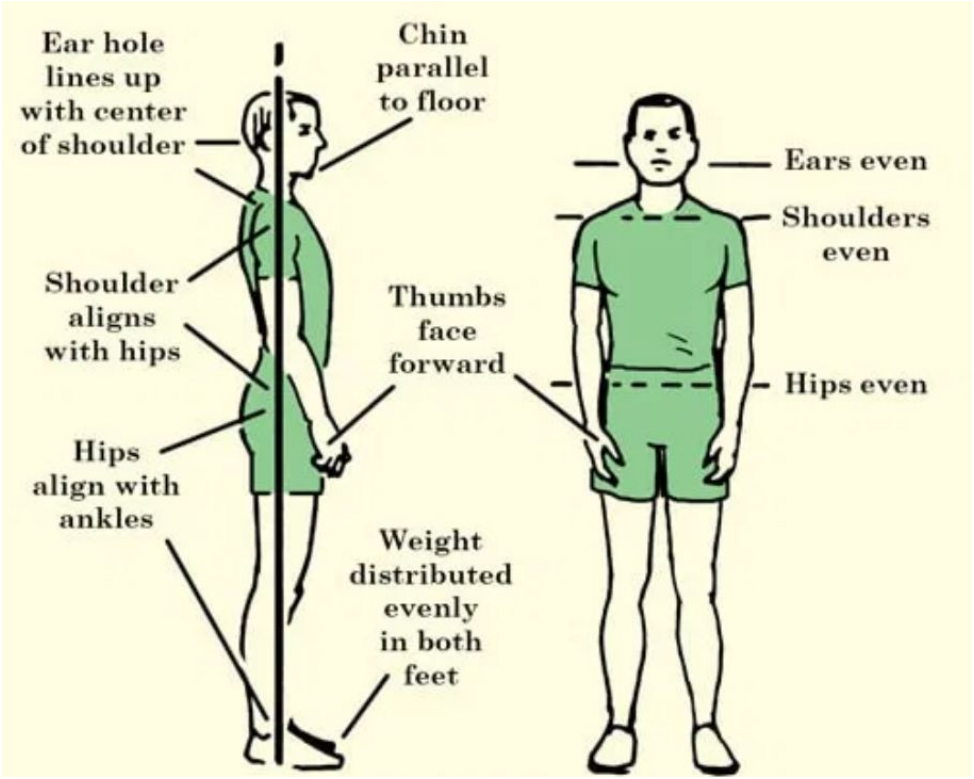
Before developing our fighting stance, we must first establish a *Neutral posture*. That is the posture that is attained "when the joints are not bent and the spine is aligned and not twisted.” This is easy to achieve by keeping both the Shoulder Girdle and Pelvis in vertical alignment and the Skull centered and facing forward, while also placing one’s feet approximately hip-width apart.

It is also worth mentioning that doing this optimizes the action of the diaphragm, allowing us to breathe in a less restricted manner.



The Neutral Posture

- The Spine is aligned vertically
- Shoulder Girdle and Pelvis in alignment
- Skull centered and facing forward
- Feet approximately hip-width apart
- Joints are not bent



Section One/D: Muscles

Muscles….we all have them. In fact we have have three main types, only one of which we are going to discuss in-depth as it the only one we can control. The three types are: Cardiac, Smooth and Skeletal.

Cardiac muscle: It's your heart…yes even I have one!

Smooth muscle: Make up your other organs/ body structures.

Skeletal muscle: The movers and the shakers.

Special Note: Cardiac and Smooth Muscle are INVOLUNTARY. They do what they do until you die, never listening to you at all. Therefore we are not going to dwell on them.

The Muscular System

Muscles are bundles of cells and fibers. Muscles work in a very simple way. All they do is tighten up--that is, contract--and relax.

You have two sets of muscles attached to many of your bones which allow them to move.

There are 630 active muscles in your body and they act in groups.

Muscles can only pull. They never push

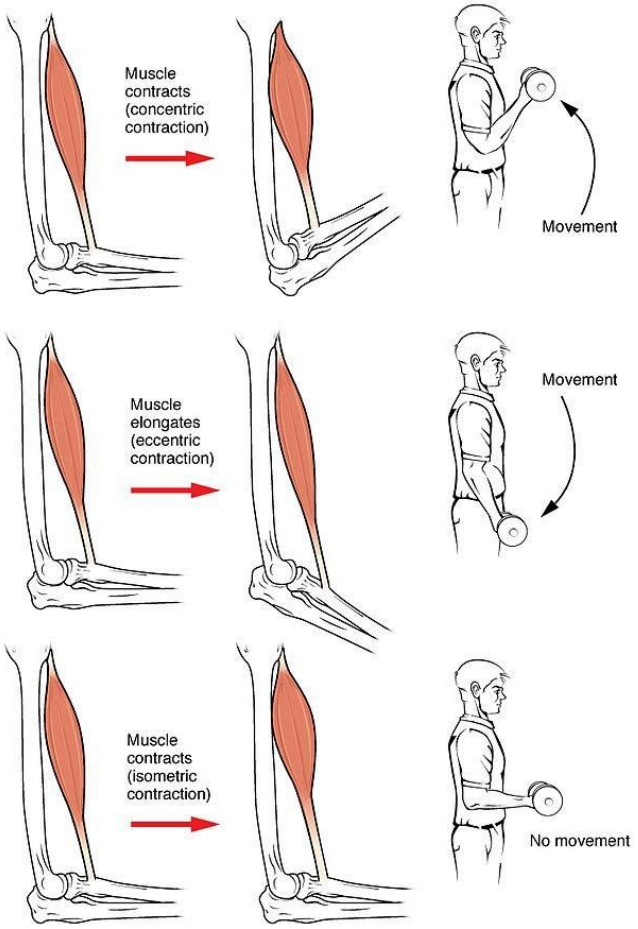
Muscle action(contraction)

This can be a complex subject…but in this discussion we are really only going to discuss a couple of points. Namely *Concentric*, *Eccentric* and *Isometric* movement. You don't think you know this, but you do….I promise.

Concentric is when a muscle gets SHORTER to exert a force.

Eccentric is when a muscle gets LONGER to exert a force.

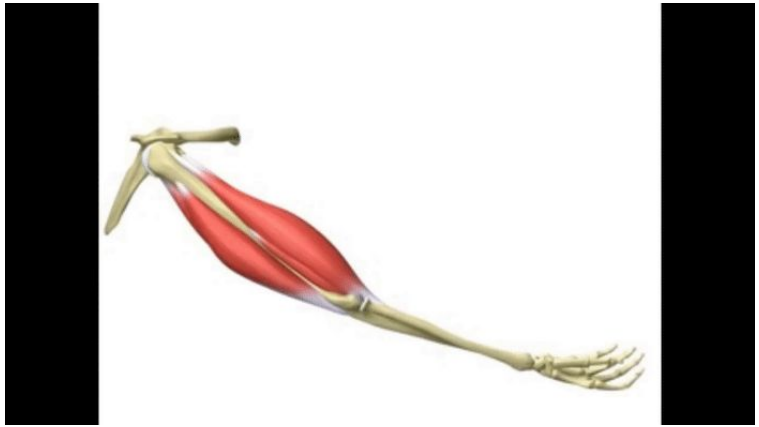
Isometric is when a muscle creates tension but does not change in length, therefore does not move a joint/limb. Isometric is often the harder action to describe.
It is commonly done unconscionably in preparation of an action…especially an 'explosive' action such as a jump, leap or swinging a sword.(SEE! We are still talking about fighting!!) or to resist a outside force like gravity.



Muscles: Working against themselves

There is also a (mostly) subconscious/automatic action of Eccentric contractions that normally occurs as a braking force *in opposition* to a Concentric contraction to protect joints from stress and impact damage.

During virtually any routine movement, Eccentric contractions also assist in keeping motions smooth, such as when one strides or raises an arm. However, these Eccentric contractions can also slow rapid ‘explosive’ movements such as a punch or thrown sword blow.



Muscle Actions: Safety Third!

While it might seem a good idea to use Isometric contractions to keep one's muscles 'loaded' at all times, there is a limit to the effective return. One SHOULD develop the ability to use Isometric contractions to shorten response times, however a more effective idea is to work to control Eccentric contractions working counter to a action when performed. A practice to do this is *Follow-thru*.

Follow-thru means to shoot THROUGH a target…not TO it. When you throw a strike at a target your automatic biomechanical action is an Eccentric contraction to counter the strike, this is done to limit the damage done to yourself by the strike. This is a learned behavior, but one often we are NOT conscious of as it occurs in a pre-verbal phase of our development. There are many things written by much smarter people than myself on this subject…but the 'work around' is fairly straightforward. Simply put… Change the point of aim. Do not strike to CONTACT, strike to PENETRATE. Effectively what you are doing is overriding the 'safety' function of the automatic Eccentric contractions until AFTER the strike has arrived to contact at full speed.

All these muscle actions take up chemical energy, of which there is a finite amount available at any given time. I do not think we need to go into Myofilaments construction and ATP/Glucose rates for this discussion…just that muscle actions cost 'calories' to use a common term.

The Economy of Violence

The Economy of Violence is a core idea to my way of thinking. All actions of the skeletal muscle system burn energy, and this energy is finite. Again, I do not want to get into ATP/Glucose rates and conversion of lactic acid for this discussion, so let us approach this from a slightly more 'vernacular' perspective. Most everyone has heard the term 'calorie', even though we often use the term to mean kilocalorie, we will continue to just refer to a unit of energy as a 'calorie'.

Each action taken requires the expenditure of some calorie value, and as previously stated, there is a finite amount available. As a thought experiment think of one's 'calorie reserve' as a counter. A counter that each action taken…even things like isometric loading….reduces. Also, as the counter decreases the rate of exchange/cost for each action INCREASES thereby accelerating the countdown. This is where we must ask ourselves a simple question… *"Is this action worth the cost?"*
We should NOT be spending caloric energy on actions that are not directly translated to the point of a combat system….violence.
If one expends energy, it should be either in directing violence to an opponent, or canceling the violence from an opponent.

Violence Cost, Spend wisely.

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A Fighter System

Section Two: Stance and Movements

Section Two: Stance and Movements

Having discussed the biomechanical systems a bit, let's discuss how we should structure our fighting stance. This is where we begin to fold in the vast array of fighting documents and apply the commonality of them. A good base stance(again based on the overlapping commonalities of all the recorded fighting systems) is one that optimizes the mechanical system of the Human. This is best described by a small participatory exercise in which we try and locate the Human 'neutral fighting position'.

Section Two/A: Lower Body Stance

Stand up, now place your feet a comfortable distance apart but generally centered below your hips, with your head, shoulders, knees and toes pointed forward. This is the Human base Neutral Posture.

Look down and note the distance between your feet…Nominally this distance is roughly the width of one's hips. Now while keeping one foot in place, step BACK with either foot(try both and find which is more comfortable to you) a distance no GREATER than the noted spread. Slightly bend your knees…Isometrically 'loading' your quadriceps(thigh muscles), and you should find your trail foot knee is inline with and over your toes and your lead foot knee is inline with and over your ankle. This helps one naturally 'unweight' the heels and put more of their body weight on the balls of the feet, further enhancing the 'loading' of the lower body. Keep your toes, hips, shoulders and head pointed generally in front of you.

Section Two/A: Lower Body Stance

THIS IS IMPORTANTMany people try and turn their ‘back’ foot at a 40-90° angle away(out)from their shoulder. This is one of the SINGLE biggest mistakes, from a biomechanical point of view, SCA Armoured fighters make. Turning the back foot is useful for cases where one must deflect/throw a opponent, and as such has been shown in MANY fight systems, primarily unarmed systems with an emphasis on throws/deflection tackles as well as systems in which the ‘lunge’ is central. To be clear, there are times it is a useful action…but it should NOT be the neutral position one begins from for SCA Armoured fighting specifically, but rather a ‘transition position’ for other actions. Not only does turning the ‘back’ foot interfere with the mechanical advantages of our pelvis and shoulder girdle, it also INCREASES the distance one must move their upper body to a target or block, and places the ROM of the upper body off line from the fight. Repeat after me…

“Toes in the work.”

Section Two/A: Lower Body Stance

In fact, the ‘turn out’ of the back foot is likely directly attributable to strains and injury to groin and pelvic girdle muscle groups, as well as lower back pain caused by overreaching the ROM of the pelvis to make up for the distance lost by displacing the angle of the femur as well as upper body strains to the shoulder, particularly in the active (sword) side and damage to overtaxed ACL tendons in the knee.

Section Two/B: Upper Body Stance

Here we'll try another participatory action building on our Upper Stance. With empty hands, try to place your upper body into a 'neutral load' by keeping your shoulders and hips square, raising your hands above waist level with your elbows down but not pressed into your side. One should find their 'primary' or dominant hand naturally seeks a higher position, often between their pectoral muscle group and the chin, meanwhile their 'secondary' or non-dominant hand seeks to be around the pectoral muscle group and the upper abdomen. There a number of factors for the commonality of this stance, some of them learned/observed behaviors, others evolutionary based. This placement of the hands/upper body intrinsically allows one to protect or 'cover' both our abdomen and our vulnerable face/throat area while at the same time trusting our rib cage to mitigate some possible damage to our core torso.

Section Two/D: 3 Steps and a Slide.

Once we have settled in our Neutral Loaded Fighting Stance, we need to discuss movement.

There are four basic footwork actions/steps we will discuss.

The Passing Step: This is the most advantageous kind of footwork action one can take in circumstances where we want to advance/fade out quickly and change our Distance. It is also the one most natural to us as bipeds. Recalling how we settled into our Neutral Loaded Fighting Stance [Section Two/A] the Passing Step is simply exchanging our trail foot for our lead foot...and vice versa....without a pause in the action. The Passing step ALSO highlights how our Neutral Loaded Fighting Stance is valuable as it is functionally a component of normal Human stride.

This Passing Step not only allows one to close and/or gain distance quickly, it also aids in powering shot mechanics by engaging hip action into our strikes/blocks/voids. Additionally, one is never unbalanced and a Passing Step is much easier to redirect in mid-action.

Section Two/D: 3 Steps and a Slide.

The Gathering Step: The Gathering Step begins from the same Neutral Stance, however rather than trail foot becoming lead foot...trail foot comes up to lead foot, while our feet remain roughly still spread at hip width, and then stepping forward while maintaining our previous lead/trail foot arrangement. The Gathering Step can also be used to fade out, by pulling lead foot to trail foot, then resuming the previous stance but pushing back the trail foot, however it is notably slower than a Passing Step. One should only use the Gathering Step when it can be completed safely as the transition point(with one's feet parallel) is limited in balance. It is useful for staging an explosive movement, ie to 'spring forward'.

Section Two/D: 3 Steps and a Slide.

The Expansion Step: The Expansion step is like the Gathering Step, but hinges on the expansion in the depth our Neutral Stance with one foot, then pulling the static foot back to our neutral distance. This can be done with either lead or trail foot as the active foot, like the Gathering step, although it differs in one's feet are never parallel. The Expansion step is best used in a lunge/thrust set, as it limits the mechanical power that can be generated to a cut/strike due to the depth of the base.

Section Two/D: 3 Steps and a Slide.

The Slide: The Slide is when we maintain our lead/trail foot positions but move left or right, expanding the width of our stance but maintaining the depth. The Slide is useful for voiding or sidestepping an opponent's action, which allows one to maintain centerline orientation on our ‘target’ while at same time removing us from theirs. It can be used offensively, but most commonly is defensive or position gaining in nature. Care must be taken to NOT ‘cross up’ our feet. If one wants to Slide opposite the lead foot, action should be done with the trail foot, and vice versa.

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A Fighter System

Section Three:
Measure and Distance

Section Three: Measure: Don’t come up short.

Measure is a word we say a LOT. But….What does it MEAN?

Measure, in the way I am going to discuss it, is made of of 3 interlocked components:

Distance

Timing

Pace

Section Three/A: Distance.

In any group of SCA Armoured fighters talking about fighting, someone will drop the ‘A/B/C Range’ nugget.While I understand why it started…I feel we have to stop using ‘A/B/C Range’ in discussing and teaching distance. This is for SEVERAL reasons but not the least of which is this….Define A.

Is it extreme close…like in the others fighters pants?Or is it at the extreme outside of weapon length?

I have heard and been shown both in training, in my home Kingdom and abroad.

‘A/B/C Range’ has no intrinsic definition. It is a abstract way to describe a real thing, and as such must be defined by EVERY user.

As a teaching or training aid….not the best thing ever.

Also, the A/B/C example most often assumes all distances are within weapon length, where one can strike an opponent.

To that end…I propose the following:

Section Three/A: Distance.

Reach: The place where a weapon can REACH an opponent without footwork/change in position.

Range: One action outside REACH , up to the extreme outer limit of the List.

Do these 2 terms contain ALL the subtle variations of distance? LMAO...No. Oh Dear Elder Souls *NO*. HOWEVER they present, to my mind, a much easier to discuss set of ideas. It also helps stop the idea that one should fight inside weapons Reach. A large percentage of fighters do not begin actions until they are well inside Reach. In fact....critically watch videos of single fights and you will see how many fighters, of all 'levels' of prowess, stalk into Reach and then work to win a pass with Timing and Pace alone.

Section Three/A: Distance.

Also of note: Reach is NOT static nor is it equally applied. It is defined by the relative length of weapon and arm length of each fighter. It is possible for two fighters, with equal and matched weapons to have different Reach values. There are in any given match TWO Reaches in play. One's own and ones opponent. It is possible to be in your Reach, whereas your opponents is outside theirs...or conversely you within theirs while you remain outside your own.

Range, as defined here, is one ‘action’ outside Reach. This ‘action’ most commonly means a step/footwork. This theory leads us to the easiest way to define our desired Distance. Which is; our goal is to maintain a distance that borders on the edge of Range/Reach of first ones opponent, then oneself. This makes footwork(the act of crossing from Range to Reach and vice versa) more central to one’s fighting than is common is SCA Armoured combat as a whole.

On this...pretty much every Manual, Treatise, or Fechtbuch agrees. Footwork is super important....do NOT hang out at the end of your opponent's weapon and plan to be ‘faster’.

That’s what dead fighters do.

Section Three/B: Timing

Timing is a very difficult concept to discuss, not because it is hard to understand...but because our understanding of it is so intrinsic. Rather than reinvent terms, I will borrow from a old angry Englishman, we will call him ‘George’.

Timing can be broken down into a series of speeds...and the ones used by ‘George’ are: Eye/Hand/Foot, with each superseding the one which follows it.

Think of it as version of Rock/Paper/Scissors.

Eye beats Hand.

Hand beats Foot.

Foot beats nothing, being the slowpoke of the list.

Section Three/B: Timing

Basically the idea is that one's Eye can process an action done at Hand speed faster than the action can complete. Also one can move their Hand quicker than the Foot.

In practical terms what this means it that an action begun at Hand speed will never be faster that an Eye can see it. Also, normally each Speed is applied to the one above/below in combined actions. These speeds are further amplified/modified by our first component of Measure; Distance as outlined above. As an example: Two fighters are at Range/Reach Interface, with similar values for each fighter. Fighter A begins a step into Reach, an action at Foot speed. Fighter B can process this action at Eye speed, which can complete much faster than the step(Eye beats Foot). This time buffer allows Fighter B to either also begin a Foot speed action to step away, or a Hand speed action to throw a blow, or BOTH.

The Foot action of Fighter A will complete before Fighter B's, but the Hand speed action of Fighter B will complete before the Foot speed action of Fighter A. Please understand, I am not proposing that fighting can be reduced to a graph and run as a simulation or a dice/stat roll. I am simply trying to show that Speed has tiers, in a general sense. This is a way to think about the planning and order of actions one takes.

Section Three/C: Pace

Pace is another aspect of Measure that seems hard to discuss, and is often misunderstood.

Many think that to control Pace they must move more often and faster than their opponent. This is partially true, however intentional inaction can also be a Pace controlling method. Controlling Pace is best described as Distance management and dominating the intent of actions and their Timing(Eye/Hand/Foot) for both oneself and the opponent.

Section Three:Summation

As you can see, this approach to Measure while discussing it in divided terms(Distance, Timing, Pace) only highlights their interconnection. One can not have full control of Measure without control of the 3 aspects of it, as well as how they build on each other.

Section Four:Too Many Minds

I want to touch on my thoughts on thought processing.

First a couple of points need to be clarified. Humans have long thought of themselves as ‘special’ because of our wondrous brains...and believe it sets us outside the Animal Kingdom. I find this to be a disservice, we are animals...just very very odd ones.

Our fantastic Human mind is an amazing construct of self...one which there are volumes and volumes written...and yet our understanding of it remains limited. But herein lies a central point to the system we are building:Fighting is not done with weapons, bones and sinew...it is done with Minds.

The human mind is made up of layers...like an onion...or a cake. :)

Section Four:Too Many Minds

The way I offer we approach theses layers is thus: Lizard, Monkey, Sentient.
The Lizard is the part of our brain that regulates autonomic functions like endocrine and reflex reaction.One really has no input to the Lizard...it does what it does and cares not for your wishes, short of chemical warfare. One rarely notices the Lizard until it becomes a problem/challenge.

The Monkey is our base instincts, as well as LEARNED reflex actions commonly called ‘muscle memory’. In fact it is the one that is most commonly in ‘charge’ of our bodies normal activities/movements. The Monkey does what it has learned to do, but it can be ordered around to a degree by the more complex Sentient brain. When one does an common/rote action or movement it is the Monkey that drives.

The Sentient is were you hold lyrics and movie quotes. You also do all your (over)thinking here. The Sentient is the often the director, not the actor when doing physical actions. If you don’t believe, that try to walk across a room by ACTIVELY raising and lowering your feet.
Don’t just think about walking, actually make each muscle movement as a direct action. It’s funny, trust me.