A Groundwork Primer

Randy Vogel

§1. Introduction

§1.1. Basic notions

§1.1.1. What is Groundwork?

For the purpose of this article, groundwork is used to refer to any form of motion or technique that is performed from the ground. Activities in this realm range from basics of position, agility and transitioning skills, to holds, chokes and joint locks, on up to and including free combat techniques (with strikes) from the ground. As this paper is intended as a primer, the focus will be almost exclusively centered on the concerns of the beginning student, rather than on the specific techniques or the multitudinous complexities of combative sparring and self-defense situations.

§1.1.2. Why a primer?

My experience from learning and teaching self defense skills at UCMAP over the past two decades is that for the vast majority of incoming students (myself included), groundwork is a new experience. How best then to teach this topic but to start at the beginning, so that we may establish a common reference to describe the basics of position and technique.

This paper will begin by discussing general principles of groundwork (§1.3) and then proceed to warm-up exercises (§2), particularly stretching and

balance drills (§2.5 and §2.6, respectively). Section Three, Groundwork Basics, introduces important additional vocabulary (§3.1 Base, §3.2 Positional Dominance, §3.3 Additional Dictates from Physics and §3.5 Hooking) and surveys classic groundwork positions (§3.4). Finally, Section Four presents approximately a dozen drills appropriate for beginners.

§1.2. Why is this primer necessary?

§1.2.1. Student need is greater

Because the vast majority of students entering Yongmudo lack prior experience in a grappling art, their prior experience with other martial arts such as Taekwondo, Karate, or Wushu affords less help in groundwork than in other areas. Consequently, beginning students, even with other martial arts experience, usually need more help in developing a solid base in groundwork skills.

§1.2.2. Groundwork basics demand review.

Groundwork skills tend to get the short shrift in warm-up exercises. Although some of the groundwork exercises are not particularly aerobic, it is reasonable to expect that as students become familiar with the drills, they will be able to perform them faster, thus enabling the inclusion of these drills among those typically performed for warm-up exercises. By increasing the extent to which students review these basics, we will better prepare them for those situations that call for use of these skills.

§1.2.3. Basics should come before techniques.

Most groundwork instruction tends to focus on specific techniques rather than developing generally useful skills. It is necessary and important to teach techniques sooner or later, but beginning students, particularly blue belts and lower, ought to benefit from increasing the proportion of instruction that focuses on building basic skills, agility and general comfort with being on the ground. Once developed, these skills should provide a firm foundation for instruction in specific techniques.

§1.3. General principles of Ground Fighting

Although many martial artists hone their skills in order to avoid going to the ground, such an ostrich-like approach ignores the tendency for untrained fighters to grapple. Furthermore, unanticipated circumstances, such as slippery winter surfaces or being unexpectedly knocked down by an assailant, offer additional reasons to motivate students towards developing at least a few basic groundwork skills. Before proceeding to drills, it will be useful to review some important conceptual notions regarding ground fighting.

§1.3.1. Key off of the opponent's hips to control distancing.

- When attacking, you will generally act so as to draw the opponent's hips closer to your center of mass and decrease their mobility.
- When defending, you will generally want to create space and drive the opponent's hips further away so as to increase your mobility.

§1.3.2. Attack/protect vital targets.

In all forms of sparring, learning to position oneself with respect to an opponent is a key skill for both offense and defense. Finding the proper balance between the need for good defense and the desire to initiate a strong offense is part of the joy of groundwork. Aside from the notion of spacing, groundwork expands this concept greatly to include such minutiae as how to use a hand block or a chin tuck to avoid being choked. Note that in self-defense situations, it is nearly impossible to protect all of one's vitals. Consequently, even the strongest holds leave openings for counterattack.

§1.3.3. Improve your situation via positional transition.

One of the defining skills of a good ground fighter is the ability to transition smoothly and efficiently from one position to a superior one. Furthermore, the master fighter will do so without giving up any advantage to the opponent.

Given the difficulty we have in using our limbs for attack or defense in the rear hemisphere (behind the plane defined by the hips and shoulders), it should be obvious that the practiced fighter will avoid exposing their back to the opponent. Conversely, taking an opponent's back (by putting them into a prone position, for example, rather than allowing them to remain supine – definitions of these terms are given in §3.4.2) permits attack from a position of relative safety.

Keeping the head near the opponent's center of mass will generally result in a more secure position than allowing it to move towards the opponent's head or extremities.

Parallel body alignments tend to favor the defender, while perpendicular alignments tend to favor the attacker.

The drills presented in §4 emphasize position changes because this skill is a key for success in ground fighting.

§1.3.4. Learn to use body weight to improve controls.

Effective use of body weight will make it difficult for your opponent to breathe, impair their ability to move, and generally foster a sense of inferiority that will contribute to eventual defeat.

Lowering your center of gravity will generally improve your controls, but at the expense of reducing your mobility and the speed of your transitions.

In order to achieve a good hold, your center of mass will need to lie on or within the pentagon established by the head, shoulders and hips of your opponent (the 'corners').

§1.3.5. Pay attention to the limbs.

Defensively, each limb that you control becomes one less weapon available to be used against you. Offensively, be prepared to take advantage of the opportunities offered by a stray limb. Subtle body movements often signal intent; remaining loose and limber will better permit sensing of these tiny motions.

Generally speaking, motion of the head (or constraint thereof) leads the body. An opponent preparing to bridge will often turn and look prior to setting a foot down and beginning the hip pop. Using a leg to push the face away from an arm bar will impede the ability of the opponent to resist that lock.

Tying up one or both of the opponent's legs will seriously impair their ability to effect useful transitions, but of course, this will likely come at the expense of

your own mobility. Unfortunately, it is quite difficult to control all of an opponent's limbs; you may be best served by aiming to restrict or remove from battle those limbs causing you the most trouble. Some of the drills below will aid with the planning aspect of groundwork transitions, setting up moves into positions advantageous for subsequent limb attacks.

§1.3.6. Use your head.

One of your best weapons is the ability to think ahead and engineer your victory. Once you have developed a repertoire of reliable controlling or finishing techniques, look for chances to implement them during a fight.

Asserting confidence, even from an inferior position, can be an important tool in convincing your opponent that the battle is lost.

In another dimension, learning applied physiology – developing a practical knowledge of the body, how it works, and how it is put together – will be invaluable in informing the ground fighter as to which moves will be most effective.

§1.3.7. Work on your grip.

The maxim two hands are better than one certainly applies in ground fighting. Any number of techniques may be used to increase one's hold and defeat counters; these include: grasping your hands together, grasping the wrist, intertwining about an arm or leg, and grasping clothing – either yours or the opponent's. The general rule to follow is that any sort of anchoring grip or latch which increases your hold will work to your benefit once the opponent counterattacks.

§1.3.8. Learn to use the whole body together.

Another area where beginners often fall short is in neglecting to use the entire body. Of course your arms may be engaged in acquiring an arm bar, but if the torso and legs are simultaneously engaged in maintaining a controlling pin, the arm attack will proceed that much more smoothly. Learning to use the whole body in coordination is particularly important when faced with a larger and stronger opponent.

Consider, for example, a situation where a smaller attacker has managed to acquire an ankle lock via the radial edge of the arm. By clasping the hands together, the attacker can first use both arms to secure the grip, preventing escape. Secondly, by pushing one or both legs against the defender's hip while arching backward, the attacker will greatly increase the force exerted against the Achilles tendon. Hence the smaller assailant may successfully overcome a larger attacker, despite the fact that the attack is directed at the leg – the location of the attacker's largest and strongest muscles.

In general, the large muscles of the spine and chest (or torso) may be thought of as the source of power – popularly referred to as the core – for implementing

strong moves. These will generally be modulated through use of the waist, which acts somewhat like a steering wheel to direct this power to one or more of the extremities. Learning to activate and quickly direct these large muscles will lead to faster techniques and an improvement in overall agility. Conversely, stiffness in the waist and torso will inhibit the ability of the arms and legs to respond quickly because this "inner tension" reduces the range of motion of the extremities.

§1.3.9. Develop your agility.

Agility is defined as having the power to move the limbs quickly and easily. To be agile is to evince the qualities of being nimble, alert, dexterous and quick.

Agility is important in all fighting arts; combatants must learn to evade an opponent's attack quickly and also to swiftly detect and capitalize upon opportunities for counterattack. The need to train students to recognize groundwork attacks and respond appropriately is no less than the equivalent need in other fighting arenas, such as kicking and punching or standing throws.

Basic drills which promote development of groundwork agility are likely to be unfamiliar to most students, as groundwork agility is less likely to overlap with other sports than standing agility drills, which are often practiced in both martial arts and recreational sports.

§1.3.10. Develop your sensitivity.

As mentioned above, informed knowledge of biomechanics can lead to more effective transitions and stronger locks through application of those principles.

Another application is to take isolated touch information – perhaps the grasp of a hand – and extrapolate the overall orientation of the opponent's arm and body from that touch to gain an advantage. Such a skill will be gained naturally from practice of various groundwork drills, but paying attention to this information is the mark of a skilled fighter.

Beginners sometimes complain that groundwork is more tiring than other forms of sparring. While possibly true, it is more likely that the beginning fighter is exhibiting tension in their positions, leading to self-resistance in the initiation of motion, and a faster drain on one's energy capacity. This tension also contributes to an easier defeat – note how much easier it is to tip over a rigid wooden chair than a bean bag of equivalent weight. The example above suggests that affecting a supple, dead-weighted position in a control will aid resistance against positional counterattacks.

The beginner should also hone their sensitivity in addition to agility. In the opening phases of a confrontation, agility may be the key to successful outcomes, as without the speed to implement a useful course of action, the knowledge of that opportunity is useless. On the other hand, once strong control of the opponent has been established, the application of compliance or submission techniques ought to proceed in a careful, calculated manner so as not to lose one's superior position to a counterattack. At this point, sensitivity to the opponent permits the fighter to read both the effectiveness of the current attack and the likelihood of imminent counters. As in chess, the better opponents will typically be thinking one or more moves ahead, and developing one's ability to foresee such

changes requires the sort of sensitivity that arises from hundreds of hours of training on the mat.

§1.3.11. Use physics

Many important ground fighting attacks rely on the principle of the lever and fulcrum to implement a limb bar of some sort. In brief review, a fulcrum is set so as to provide a pivot point about which the lever will be rotated through application of a motive force. In carrying out such an attack successfully, the attacker must perform several important tasks. First, the fulcrum must be properly placed so that the lever – the limb being attacked – can be loaded with enough force to induce the recipient to tap out or risk injury to the joint or limb. Second, slack needs to be removed from the skeletomuscular system so that the lever will not wobble or drift along the fulcrum during the attack. These preconditions then maximize the effectiveness of the third component: application of force to the end of the lever.

Of the two-hundred plus bones in the human body, over one hundred are located in the extremities, and are thus susceptible to levering attacks. As an aside, note that for a given amount of force, most joints are more vulnerable to twisting, torsional attacks rather than linear, levering attacks that rely on hyperextension of a limb across that joint. Removing slack by twisting a limb combines this weakness with the need to immobilize the limb across the fulcrum, generally resulting in a stronger attack than those which are purely linear.

Note that while it is common to use one's own limbs for the fulcrum by barring the opponent's limbs more or less perpendicularly across a boney prominence, another useful approach is to use the ground as a

fulcrum point. This can be particularly helpful in ground fighting as it permits the attacker to concentrate force from multiple limbs against the joint being attacked. Furthermore, as the ground is necessarily beneath both combatants, such attacks also may permit the attacker to drive their weight against the lever, further magnifying the effectiveness of the barring technique. Finally, pressing the defendant into the ground also limits their mobility, further increasing the attacker's control of the situation.

Anatomically speaking, the bones are held together by a network of ligaments. Muscles attach to the bones via tendons, and generally cause movement by contraction. Most lever attacks produce painful stretching of these connective tissues (the ligaments, tendons, and muscles) rather than literally causing bone breaks, as the limits of elasticity of these tissues, particularly the ligaments, is somewhat lower than the breaking strength of the bones that they connect. To quickly classify injuries to these tissues, sprains result from overstretching of the ligaments, strains and tears occur from injuries to the tendons and muscles. Because ligaments are composed of thick bands of relatively inelastic cartilage, they are particularly susceptible to catastrophic tears, as commonly occurs in skiing and basketball injuries, caused by falls against an immobilized knee. Furthermore, while some attacks produce extremely localized injury, many cause more diffuse systemic damage, which compromises the structural integrity of the joint.

Consider the hammerlock, for example. With the recipient lying prone, the attacker levers the bent forearm upwards against a fulcrum point located beneath the shoulder being attacked. Although the

defender may tap out quickly from such an attack, the cumulative stress of repeated locks against the shoulder can result in a situation where dislocation of the arm from its socket is a considerable worry when the injured shoulder joint is later confronted with any sort of attack that relies on outward or rear-directed forces. This repeated trauma to the connective tissues, which formerly kept the ball joint of the upper arm tightly within the socket of the shoulder, reduces the ability of those tissues to hold the shoulder in place.

§1.4. Types of Drills

§1.4.1. Warm-up and Fitness

Warm-up and fitness drills are used to improve physical attributes such as cardiovascular capacity, core strength, power delivery, coordination, flexibility, agility and so on. In addition, demanding fitness drills also help the participants improve their mental game, as such drills require concentration and attention despite the distraction of fatigue. Section Two of this paper lists a small number of warm-up and agility drills.

§1.4.2. Skill-building

The purpose of skill-building drills is to focus attention on specific techniques that can be used to develop a competitor's strategy and tactics. The general goal is to practice these skills sufficiently that the movements become instinctive and automatic when needed, rather than requiring conscious effort and application. Section Four of this paper describes several basic skill-building drills focused primarily around the concept of carrying out position-changes.

§1.4.3. Situational Practice

Yet another important type of drill is the open-ended situation drill. For example, free-sparring with one or more partners, or the four corners drill commonly practiced at UCMAP. In the interest of narrowing the subject under discussion to ground fighting basics, and because these situational practice activities depend on a higher level of expertise from the participants, situational practice drills have been omitted from further consideration in this paper. This is not to say that they are unimportant, only that they are beyond the scope of this primer.

§1.5. How to perform these drills

Drill practice will always fall somewhere along the continuum between the ideal and the realistic. For solo drills, this conflict will be resolved internally by the athlete's exercise of imagination. Partner drills ought to start off with a very high degree of cooperation so that one or both can carry out the drill successfully. As the familiarity, fitness and skill-levels of the participants increase, so too should the level of cooperative resistance, wherein one or both partners increases the difficulty of the drill task for the other participant.

While drills will typically be introduced by an instructor, for the most part, they can be practiced without supervision. Nonetheless, it is important for participants to acknowledge that the recipient of any painful technique is to tap out as the level of discomfort rises so as not to invite accidental injury, and that the person applying such technique will cease adding tension as soon as the opponent taps out.

§2. Warm-up exercises

§2.1. Why is warm-up useful?

Warm-ups are an essential part of workout because they provide an avenue for both mental and physical transition from the regular demands of the day to the special requirements of mental and physical alertness necessary for safe practice of martial arts. By stimulating the joints, muscles and central nervous system, warm-up exercises will help the participants to increase circulation and limber up in a non-stressful manner.

§2.2. How much warm-up is necessary?

Consensus among physical education leaders across many activities is that a vigorous warm-up needs to last from 10 to 30 minutes in order to provide maximum benefit. Variables impacting the necessary duration include ambient temperature of the training area, core body temperature of the participants, age and physical condition of the participants, and the type of physical activity that lies ahead. More importantly, regardless of the duration, the warm-up routine should be relatively intense! If one is not panting and sweating at the end of warm-ups, how can you say that you are warm?

§2.3. Cross-training Warm-ups vs. Directed Training Warm-ups

Given the orientation of most martial arts class sessions towards a single topic area, my preference is to run through some warm-up exercises that support the practice that is to come (such as performing falling drills before a session on throwing techniques), as well as

including other drills to review areas that will not be practiced in that session (such as stretch kicks). As increasing cardiovascular fitness is another one of the reasons for incorporating warm-up routines into a martial arts practice session, another consideration to be decided is what sorts of drills should be included to push the participant's heart rates towards that 50-60% of maximum heart rate for at least a few minutes of the warm-up time. Vigorous groundwork activities can be just as good in this respect as more traditional jogs and sprints!

§2.4. Warm-up Drills

The drills noted below are included because they are particularly relevant to groundwork. Of course there are many more warm-up exercises that have not been listed, and instructors are encouraged to mix and match exercises as they see fit.

Most common are the various locomotive drills, moving across or around the room:

- Moving on hands and feet – bear walks (face up) and crab walks (face down).
- Moving on hands and/or knees – 2- and 4-limb crawls (forwards/backwards/sideways), knee-walking, arm-walking.
- Tumbling and rolling – continuous rolls from the ground (forwards, backwards, posting, somersault, side roll, alligator roll, etc).
- Jumps, hops and lunges from the ground – (left, right, double, forward, sideways, backwards).

Typically, many warm-up exercises are performed from a standing position, but aside from custom, there's no compelling reason not to try exercises that begin from, end on, or revolve about the ground.

Furthermore, modifying traditional warm-ups to be performed from the ground (kneeling instead of standing or walking, for example) allows students to become comfortable using their arms to aid their motions, a modification that is nearly impossible to achieve from a standing position.

§2.5. Stretching Exercises

Scientific testing has shown that stretching exercises offer maximum benefit (in terms of increasing the range of motion that athletes can safely perform) when the exercises follow a period of intense activity, rather than as a prelude to such activity. The inclusion of stretching as part of this larger section on warm-up exercises is in part a concession to 'old school' thinking – that stretching should come before the primary workout session – and partly in recognition of the fact that students who are new to groundwork are likely to be as unfamiliar with groundwork stretches as they are with groundwork techniques.

Secondly, in the interest of brevity, rather than addressing the multitude of stretches that can be done to aid flexibility for groundwork, this paper will simply list some of the major options and a few examples.

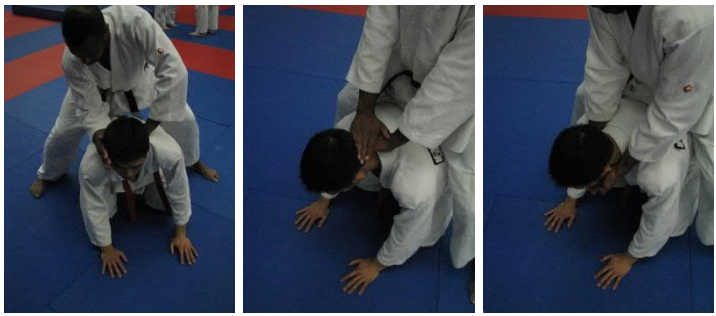
§2.5.1. Stretching Drills for the Neck

Because the neck is both a common target for attacks and a major joint, developing neck strength is important for groundwork. This next pair of drills falls somewhere on the continuum between strength exercises and stretches, and may be easily modified to emphasize either aspect. The exercises are designed to be slow, careful stretches rather than quick ballistic

ones, and they may be performed lying down flat on the back, seated, or standing.

To perform the solo version:

- Students should first be directed to move the neck throughout its entire range of motion in a gentle circular fashion, loosening the spine and helping to lubricate the cervical vertebrae.
- Next, work the extremes: left and right, front and back, and diagonal twists too.
- The mouth should be kept shut throughout (lest the flapping jaws interfere with the drill activity!), though not clenched, and one or both hands may be used to gently hold the head in place once the extreme ends of the range of motion have been attained (though use of the hands and arms is not strictly necessary, and cautioned against for those recovering from neck injuries).
- Hold the stretch for 10–20 seconds at each extreme.



To move this stretch in the direction of a strengthening exercise, recruit a partner! To perform the partner version:

- Begin on your hands and knees, face down, with the neck hanging loosely.
- The partner then straddles and places the palms

against the neck, offering resistance as the first person pushes up, pulls down, or pushes and pulls to either side against the resistance offered by the partner.

- Communication about the degree of resistance and range of comfortable motion is the key in making this a useful activity.

The Simple Bridge drill presented in §4.1 offers a somewhat more challenging neck exercise.

§2.5.2. Upper Back Stretches

Because many ground attacks target the shoulder, stretches for the upper back can be especially useful in relieving tension from past injuries. As with the neck exercises, these may generally be performed lying down flat on the back, seated or standing

- Shoulder Blade Pinch – interlace the fingers behind the head and pull the shoulder blades together to create tension in the upper back. To ensure that the neck is not tense while performing this drill, this stretch can be combined with simple neck turns or rotations.
- Up and down stretch – hold one arm over the head, palm forward, and the other along your side, palm down. Now reach simultaneously in opposite directions. Hold for a few seconds and then switch sides.
- Horizontal and Vertical Shoulder Stretches – using one hand to provide resistance, push or pull on the other elbow while folding the arm horizontally across the chest or holding it up vertically and then reaching downward behind the head.

§2.5.3. Lower Back Stretches

Aside from their importance in aiding mobility during groundwork, these lower back stretches are also a good fit for classes on rolling and falling, or throwing.

- Rock and roll – lying on the back, curl into a ball and roll gently back and forth, side to side, clockwise and counterclockwise. The head should be tucked in, but not so much that the neck is tense. For a small variation, try crossing the legs throughout the exercise.
- Diagonal Stretch – hold both arms over the head, palms up. Stretch diagonally by reaching simultaneously with one hand and one foot in opposite directions. Hold for a few seconds and then switch sides.
- Outer Gluteus Stretch – relax and lay down so that the back is flat against the ground, then use the opposite hand to draw one knee up and across the other leg. Keeping the lower back and shoulders flat, try to touch the ground with the knee. Hold for a few seconds and then switch legs. For a bigger stretch, try to keep the leg extended rather than bending at the knee. A partner can assist in either version of the stretch, and also provide resistance to push against while reversing the direction of motion upon completing the stretch.

§2.5.4. Groin Stretches

Because many ground transitions require quick, precise movements of the lower body, this section will conclude by listing several stretches aimed at loosening that area.

- Lying hurdle – relax and lay down so that the back is flat against the ground, and use the hands to

draw one knee straight up towards the chest. Hold for a few seconds and then switch legs. Be sure to keep the lower back flat. For variation, the knee can be drawn up and across the chest towards the opposite shoulder to increase the stretch in the long muscles on the outside of the hip.

- Lying butterfly – rather than doing butterfly stretches from a sitting position, relax and lay down so that the back is flat against the ground. Keeping the soles of the feet together, gently rock the knees up and down, stretching the inner groin muscles. A partner can assist by pushing or standing on the lower quads to help press the knees to the ground.
- Lying leg curl – lay down with the back flat, feet pressed against the floor and knees up. Cross one leg over the other and use the top leg to pull the bottom leg towards the floor. At maximum stretch, the head, shoulders and upper back should still be relaxed and flat. Next, while pushing down with the top leg, pull the bottom leg back to an upright position. A partner can offer a push or resistance in place of the top leg.

§2.6. Simple Balance Drills.

The following drills are aimed at developing balance, leg strength, flexibility and body awareness for the improvement of agility.

§2.6.1. Stand to Cross-legged Sit

This is a good drill for beginners, and would fit nicely into an introductory class on basic falling techniques.

- Begin by standing with feet at shoulder width and arms hanging down loosely.

- Lift one foot, tuck it behind the other and attempt to descend gracefully into a cross-legged sitting position. The hands may be used for balance or to prolong the period of descent.
- Pause a moment, then rise back to standing position.
- Lift the same foot, but this time bend that knee and coil the leg in front while descending to the cross-legged sitting position.
- Repeat 10–15 times each leg.

§2.6.2. Single Leg Step-down Squats

This drill requires use of a step, bench, pile of mats, or similar sturdy surface to stand upon. The height of the aid is highly dependent on the strength and balance of the practitioner. Beginners should start approximately ankle high until they can perform 10–15 reps with each leg without strain. More advanced students may wish to use a surface approximately knee high. For additional difficulty, try holding hand weights.

- Begin by standing with feet together on a supporting surface. Holding the arms straight in front of you, flex one ankle to lift the toes above the heel.
- Keeping the torso straight and upright, flex the opposite knee and slowly lower yourself towards the ground, aiming for the floor with the foot of the extended leg.
- Pause 1–3 seconds at the lowest position you can hold, then push yourself back up.
- Repeat as many times as possible, switching legs.

§2.6.3. Pistol Squats

If a stepping aid is not available, the Pistol Squat is a similar drill to try instead. In this variation, the

extended leg is held up away from ground as the practitioner drops. At the lowest point, the extended leg will be roughly horizontal. Leaning the torso forward slightly and pressing the legs together will help with maintaining balance. Beginners should be encouraged to stop at a position where they are stable, rather than dropping so low that they lose balance and fall over.

§2.6.4. Coil-down Squats.

The coil down is a variation on the Pistol Squat. In this case, the non-supporting leg is lifted and coiled, bending at the knee as if dropping into a knee-under fall. This exercise may be easier to perform with the hands held out to the sides or pulled in towards the chest rather than in front as before.



Although this section on warm-up exercises, stretching and balance drills has been fairly short, it is a regular core component of a typical martial arts class, and fitting for a primer. Beyond the fact that these exercises hewed close to the notion of supporting those skills necessary for successful groundwork, developing and expanding one's flexibility and sense of balance is useful to many areas of martial arts practice.

§3. Groundwork Basics

Picking up where the introduction left off, this section discusses many of the basic principles and

positions of groundwork. Beginning with a definition of base, the section then proceeds to discuss positional dominance and other concepts from physics and kinetics. It continues with an exploration of eight basic groundwork positions, and concludes with a brief introduction to hooking.

§3.1. Base

Base is used somewhat nebulously in many texts, but generally refers to stability. In a physical sense this means a position with a good stable base; it is resistant to being changed or overcome by a positional attack. Likewise, a position lacking a good base will be unstable and will generally be ineffective as a place for maintaining an attack or defending against another's attack.

§3.2. Positional Dominance

In classic wrestling, achieving positional dominance generally refers to gaining and maintaining a pinning hold upon the opponent, and as such, it is seen as the goal of a match. In this limited sense, a fighter whose center of mass is higher than the opponent while also falling within the boundary of the opponent's base may be said to have achieved positional dominance. With the expansion of the combat arena to groundwork by permitting joint locks and chokes, determination or measurement of positional dominance becomes somewhat more complex, as the 'upper hand' may sometimes be held by the bottom fighter. Given this set of circumstances, we redefine positional dominance to refer to a situation where one fighter has a clear, controlling advantage over the other, as evidenced by the ability to restrict the movement of the opponent

while being unconstrained themselves. Despite this complication, as a basic notion, it is wise to seek positional dominance, and when one has the misfortune of being so dominated, the first line of escape to consider is that which will remove you from that inopportune position.

§3.3. Additional Dictates from Physics and Kinetics

§3.3.1. Stability vs. Agility

A wider or lower stance is generally more stable, while a narrower or taller stance is generally more agile. Note that these are opposing traits: to be stable is to be able to resist changes in position, while to be agile is to be able to change position quickly.

§3.3.2. Center of Mass

The center of mass of a multidimensional object is defined as that point in space at which the entire mass of an extended object may be treated as being located for the purpose of kinetics calculations.

In a physical sense, assuming the absence of large frictional effects, pushing or pulling on an object along a line directed at the center of mass will cause the object to be displaced, while applying a force in any other direction will cause the object to rotate.

In groundwork practice, knowing the location of the opponent's center of mass (or of the center of mass of the limb you are attacking) can help in determining whether it is better to try and displace that mass or to rotate the object around that point.

For example, consider the desire to escape when pinned against the ground underneath a larger

opponent. It will be energetically easier to induce the opponent to stretch out parallel to your own body and then carry out an alligator roll (making an odd number of 180 degree turns about the long parallel axis of your combined bodies) than to bridge and throw the opponent off while they are straddling your torso. Although both actions require you to lift not only your own mass but the opponent's, the bridging attack requires the opponent's mass to be lifted a far greater distance.

§3.3.3. Moment of Inertia

Moment of inertia is defined as the resistance of an object to a rotational change in position; in this sense, it is analogous to mass.

Resistance to instantaneous rotational changes in position is dictated by the moment of inertia in the direction of the applied force. For example, it will be easiest to spin an opponent in the direction with the least moment of inertia – around a longitudinal axis, rather than perpendicularly to that axis – such as accomplished by the alligator roll mentioned above rather than a bridging suplex throw that tosses the opponent head over heels.

As shown in the pair of diagrams above, the alligator roll involves moving a large mass (you and the opponent) through a relatively small distance, whereas the bridging escape requires moving a smaller mass (your arms and the opponent), but through a much longer, larger radius arc. In attempting a bridging through, that increased distance of the opponent's mass from the axis of rotation (roughly oriented along your spine) requires overcoming a greater moment of inertia as compared with the alligator roll.

§3.3.4. Requirements for stability

A base may be constructed by joining the points of contact with the ground into a polygon. The incenter of the base is defined by the circle of minimum radius that is tangent to every side of the base polygon. The greater the distance of the center of mass from the incenter of the base, the greater the instability of the position.

A stable base requires three or more points of ground contact AND that the two-dimensional projection of the center of mass lies within the base polygon.

§3.4. Stances, mounts and holds

§3.4.1. Parterre Stance

Parterre – literally meaning "touching the earth" – refers to those positions taken with the hands (or elbows) and feet (and/or knees) touching the ground. In this respect, it is naturally a defensive position; it is quite difficult to launch an attack without raising one or another of the limbs, thus becoming vulnerable to a turning counterattack that leaves you lying flat on the ground.

- *§3.4.1.1. Classic position details*

- Hands slightly outside shoulders.
- Head up.
- Butt tucked slightly downwards with back curved away from ground.
- Knees touching the ground slightly wider than hips.
- Better mobility is permitted when the feet are balls down rather than top down. Leaving the feet top down is also ill-advised because it increases the likelihood of acquiring friction burns during the course of rapid positional transitions.

- *§3.4.1.2. Notes for Defensive Usage*

- The tightest tuck in parterre is commonly referred to as turtle position.
- Low position for center of mass makes this stance relatively stable, but at the expense of limiting agility.
- Ability to actively defend or counterattack is generally limited to targets lower to the ground than the plane of the face/body.
- Arms and neck are relatively vulnerable to a determined attacker.
- Both defensive and offensive use of arms or legs will compromise positional stability.

- *§3.4.1.3. Notes for Offense Against*

- One hand covers opponent at small of back.
- Most of your weight should be on the opponent. To maximize pinning effectiveness, minimize your distance from your partner and try to keep your center of mass within the bounding quadrangle of their limbs.
- May have just one foot/knee down, particularly as the other moves over/on your opponent in transition to another position or hold.
- For fastest movement, keep on your toes rather than the balls or backs of feet.

Yongmudo shares many techniques for attacking this position with judo and Brazilian jiu-jitsu. Because the high position of the defender implies an even higher position for the attacker, most such techniques begin from a somewhat unstable position. As such, these various ‘back mounts’ are ill-advised as controlling positions and thus less useful for the beginning student.

§3.4.2. Prone and Supine Positions

To take a prone position, one lies flat upon the ground, face down; to lie face up is to be supine. Both positions are quite vulnerable, and should generally be avoided, particularly as the arms and legs cannot easily be moved below or behind the plane of the face so that opportunities for safe application of either defensive or offensive techniques are quite limited. On the other hand, the extremely low position of the center of mass make both of these positions quite stable for holding an opponent, and moving out of either one against resistance requires considerable effort! Consequently, as an attacker, it is generally to your advantage if the defender can be maneuvered into either position. For self defense purposes, the prone position might be thought of as the ultimate ending position for your opponent.

- *§3.4.2.1. Classic position details*

- Lie upon the ground, stretched out in a line.
- The face may be straight down/up or turned aside.
- The arms are generally pulled in parallel to the legs and body.
- Feet may be top down or toes down (prone) or heels/flat down (supine).

§3.4.3. Guard

While many books and videos have been created to illuminate means of ground fighting from the guard, in the interest of brevity, this section will examine only the classic 'full' guard, and even then, only in cursory fashion suitable for illuminating the beginning Yongmudo student. Students interested in learning more about using this position should look to some of

the many other resources available.

- *§3.4.3.1. Classic position details*

- Lie on the ground, face up.
- One or both hips are generally raised away from the ground, as are the shoulders and upper back.
- One or both legs are wrapped around the opponent, usually about the torso above the waist.
- The feet may either be clenched together, locked at the ankles, or open and unlocked.
- The knees may be used to grip the opponent.
- The arms can be used for either offense or defense.

- *§3.4.3.2. Defensive Usage*

One advantage of using the guard is that when properly implemented, the opponent is restrained from being able to apply their weight in any attack. This results in a natural orientation towards using the guard as a means of enabling a turnabout or sweep – a change of positional dominance. Note that in any situation permitting strikes, the defensive utility of the guard is greatly diminished as it leaves the defendant highly vulnerable to such attacks, though it is certainly better than lying prone upon the ground!

- *§3.4.3.3. Offensive Usage*

As noted above, the simplest use of the guard is as a method for reversing positional dominance. More experienced students will learn that the guard can also be an effective place from which to mount a variety of joint lock and choke attacks. Given a defender's predilection for using the guard to create space, an attacker might naturally then take advantage of this

situation by initiating an attack on the legs, either to break or escape from the guard, or to establish submission via a lock.

§3.4.4. Side Mount

Side mount, sometimes referred to as cross mount, is probably the simplest controlling position for a beginner to achieve in groundwork.

- #### §3.4.4.1. Position details

- The defender is typically supine, though the position can be held against a prone opponent just as well, if not better.
- The attacker lies flat across the defender, face down and roughly perpendicular, bearing down with their weight through the opponent's chest.
- The attacker's arms are free to control either or both far corners, or to attack the defender's neck or far arm.
- The attacker's legs are free to move (transitioning to a new position), to strike with the knees (if permitted by the rules), or to control the near side corners.

- #### §3.4.4.2. Defensive Usage

From this control position, the attacker needs to be on guard primarily against being overturned by a sweeping counterattack or to losing the mount when the defender carries out a shrimping counterattack to move out from under the attacker without turning them over. Another option to beware is that if the defender can capture and hold an attacker's leg, a transition to one or another guard position may be attained.

- *§3.4.4.3. Offensive Usage*

Because the attacker has both arms free, the side mount is a relatively strong position. In particular, the figure four arm-lock (also known as an Americana lock) is an attractive option, as it works both arms of the attacker against the single far arm of the defender.

§3.4.5. Top Mount

The top mount, also known commonly as north south due to the anti-parallel orientation of the combatants, is not much harder to achieve than side mount.

- *§3.4.5.1. Position details*

- The defender is typically supine.
- The attacker lies anti-parallel, face down, pressing their chest down through the attacker's chest or head.
- The legs should be spread somewhat (the better to resist an alligator roll counterattack), and the hips lifted off the ground. The feet (or knees) can be used to exert an additional push up the body and through the point of pinning contact. More advanced practitioners may be able to use the legs to pin one or both of the opponent's arms above the head – achieving a carrot peeler position.
- The arms grip at the opponent's side or belt in order to try and control the hips – keeping them pinned to the ground will prevent many counterattacks. The elbows can be used to crush in against the defender's rib cage, increasing discomfort, and to keep the defender's arms further from the body (reducing their effectiveness).

- *§3.4.5.2. Defensive Usage*

As noted in the position details above, the attacker needs to be on guard against an alligator roll counter. Controlling the hips is necessary to prevent the defender from shrimping or bridging.

- *§3.4.5.3. Offensive Usage*

Because the attacker is required to engage the arms in maintaining control of the opponent's hips, the opportunities for further attack from the top mount are somewhat less than other dominant positions. Nonetheless, the top mount offers excellent control of the defender's head, and if a smothering attack against the face fails to achieve submission, there's always the option to move to another position.

§3.4.6. Scarf Hold

Although more complicated to attain than the side mount, the scarf hold is arguably more secure than the former position because the pinning pressure is focused through a smaller area. Moreover, the scarf hold offers a similarly wide range of options for attack.

- *§3.4.6.1. Position details*

- The defender is supine.
- The attacker lies perpendicular to the defender, facing the opponent's head, pinning the chest with the side of the ribcage.
- The legs are generally spread apart for stability against counterattacks, with the lower leg pushed towards the defender's head while the upper leg is pulled back. The lower hip should be up off the ground. The feet (or knees) can be used to exert an

additional push up the body and through the point of pinning contact.
- The lower arm can encircle the opponent's neck (which leads to choking attacks) or the opponent's far arm. The upper arm is free for attack.

- *§3.4.6.2. Defensive Usage*

As with the side mount, the scarf hold is susceptible to various shrimping and bridging counterattacks. Maintaining a strong pin through the chest will help forestall many such counters, especially as that pin will prevent the defender from beginning the body motions necessary to implementing both bridging and shrimping counterattacks. Keeping the head low and away from the legs will also help.

- *§3.4.6.3. Offensive Usage*

Bringing the head low permits the attacker to use the shoulder and lower arm to deliver an effective choking attack. Alternately, the two arms can be used to attack the near side arm, or the free arm can be used to bar the near side arm using the lower leg as a fulcrum and the upper leg as force delivery mechanism against the lever.

§3.4.7. Mount

- *§3.4.7.1. Position details*

- The defender is typically supine, though Mount can also be carried out against a prone opponent.
- The attacker straddles the defender. Although the knees and/or feet may be touching the ground for stability (and quick defense against positional counterattacks from the defender), for maximal pinning, the attackers weight should press down

through the hips and pelvis into the opponent. Whether this pin is exerted at the opponent's pelvis, stomach or chest is up to the discretion of the attacker. In the case that the attacker chooses to straddle the chest, the knees are commonly used to control the defender's arms, either pushing them up above the head (a position of relative weakness, leaving them open to subsequent barring attack) or pinning them to the ground and/or the defender's side (diminishing their utility as weapons for counterattack).

- As with parterre (cf §3.4.1 above), the feet should be balls down rather than top down.
- The arms are free to use for controlling any of the corners, or for attack.
- In the knee mount variation, one knee is used to exert pressure on the attacker's torso while the other leg posts to the side rather than straddling. Typically one hand will be used to control the hip corner closest to the knee, leaving the other hand free to control the same-side shoulder or neck. Although this variation dramatically increases the crushing pressure that can be exerted against the opponent, this gain comes at the risk of increased instability against bridging and shrimping counterattacks.

- ***§3.4.7.2. Defensive Usage***

Because of the controlling nature of the position, the mount is effectively an offensive position to hold. Inasmuch as achieving a mount permits a smaller person to avoid being pinned by a larger person, the mount could be thought of as a defensive stance, albeit remaining there will be difficult given a strong and determined opponent.

In trying to maintain a secure mount, be aware that sitting up (perpendicularly away from the opponent's torso) and/or back (towards the opponent's pelvis) opens the door for the defender to bridge or use the legs for a counterattack. On the other hand, bringing the head down towards the defender's chest (as is often done when trying to choke the defender into submission, or to avoid a swinging leg) leaves the attacker susceptible to an alligator roll counter.

- *§3.4.7.3. Offensive Usage*

Securing a good mount affords the attacker considerably varied opportunities to punish the defender, as both the legs and arms can be brought in to play against the defender, who can likely offer only weak resistance with either arms or legs. If the attacker is unable to carry out an effective choke or arm bar from this position, it ought to be relatively easy to transition to another position of dominance for a different try at attaining submission.

§3.4.8. Reverse Scarf hold

In reverse scarf hold, the attacker's body is reoriented 180 degrees by comparison to scarf hold. In other word, the attacker faces towards the defender's feet. Because submission options from this position are more difficult than other dominant positions, the reverse scarf hold is most often used as a transition point between mount and side mount or from top mount to mount.

§3.5. Hooking

Another basic groundwork technique is clipping or hooking: using one body part, the hook, to clip, catch, and restrain a body part of the opponent, the handle.

§3.5.1. Hooks

Hooks can be made with any reasonably mobile joint: hands, wrists, elbows, shoulders, neck, hips, knees and ankles can be effective hooks. Many groundwork techniques, particularly hooking, rely on proper application of that most basic tool, the lever and fulcrum. The job of the hook is to close upon the handle, immobilizing it and creating a new fulcrum for subsequent lever action.

§3.5.2. Handles

Handles can be made from nearly any part of the body, provided that enough strength or/pressure can be applied to close the hook upon the handle.

The most frequently used hook, of course, is to grasp with the hands. In any grappling situation, whether standing or on the ground, grip strength is going to make a huge difference in your practice. The ability to grasp and control an opponent's arm, for example, affords you a chance to prevent damage from arm strikes or hand-held weapons. A strong grasp will enable better application of chokes and locks. Although further exploration of this topic is beyond the bounds of this paper, the interested reader is directed to Rick Walker's Combat Grip Training article (see references), which offers many useful suggestions for developing a stronger grip.

§4. Position-changing Drills

Congratulations for reading this far! Section Four focuses on describing a set of groundwork position-changing drills appropriate for beginning students of Yongmudo. Initial practice for all of these drills is typically performed following the given steps, but the long term goal is to attain a continuous, smooth, economically flowing motion.

For partner drills, I borrow terminology from judo: the nage (literally, throw or the thrower) is the person who typically takes an offensive role, executing the technique. Conversely, the uke generally takes a defensive role and receives, resists or assists as directed in completion of the drill. In complex drills it may be difficult or impossible to formally distinguish between the nage and the uke. Hopefully, the examples presented herein do not suffer from that problem.

Note that in all partner drills, it is incumbent on the uke to maintain a reasonable level of resistance – enough so that the partner must work, but not enough to frustrate their efforts, particularly when a drill is first introduced. Communication between partners to facilitate this cooperative resistance is a necessary component of practice and this point can't be reiterated in class too often!

§4.1. Simple Bridge.

The simple bridge motion – the action of lifting the hips up off the ground – is an important component of many more complex groundwork techniques, and thus deserves a bit more attention than some of the other drills in this section. Students with a background in

gymnastics might need to be informed that this position differs substantially from the (arched) bridge exercises they may be familiar with from that sport.

- Begin by lying on the back with the hands held loosely at the sides or over the belly.
- Raise the knees and draw the heels towards the buttocks while leaving the feet flat on the ground.

- Once the heels are approximately underneath the knees, push the pelvis upward, away from the ground, lifting the back and chest as well, then roll backwards onto the back of the head.

- Students who lack sufficient neck strength may use

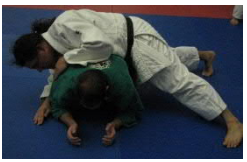
their arms to balance or elbows as additional props to lift the shoulders off of the ground. Conversely, students who are able should be encouraged to move the contact point of the head from ear to ear, or towards the forehead and nose to further develop the muscles of the neck.

As it doesn't take too much practice to master this drill, it is eminently reasonable to use it as a warm-up exercise once students are familiar with it. The drill can be further modified to become a partner drill as described next.

§4.2. Belly to Base

This partner drill promotes the strength and agility needed to move from a very bad position (prone on the belly) to a more defensible one (turtled in base).

- Defender lies face down on the mat (prone).
- Uke covers lightly, using side mount or any other loose hold, then kiyaps (yells) to signal the beginning of the drill.
- Upon hearing the starting yell, the defender attempts to get up into turtled position against light resistance from the uke.
- Switch roles and repeat 5 times.


§4.3. Two-Leg Backwards Shrimp

This solo drill promotes the agility necessary for a wide variety of more complex defensive transitioning

moves. In particular, it emphasizes how hip movement may be used to generate power on the ground.

- Lie down flat on the back (supine).
- Bring feet up to butt.
- Lift the hips and turn onto one side.
- Move hips backwards and push downwards with the hands and feet.
- Relax, reset, and repeat the drill on the other side.

Like the Simple Bridge above (§4.1), this drill may be easily included in warm-ups once students are familiar with the exercise. It can be a fun way to race across the mat against your peers on a chilly winter morning!

§4.4. Control–Escape–Control

This partner drill offers participants considerably more work than the solo bridging or shrimping drills given above. Matching partner pairs by size makes for a good start.

- Nage lies supine; uke initiates a scarf hold, mount or other controlling position.
- Nage shrimps or bridges, simultaneously using the arms to roll the uke off to one side.
- As soon as possible, the nage should take advantage of the change in positional dominance to assert a scarf hold, mount or other controlling position on the uke.
- As the original roles have now been reversed, the drill is next replayed for the other partner.

§4.5. Half-spin against the Wall

The purpose of this solo drill is to develop the agility necessary for moving quickly into and out of the guard. While most will find this an easy drill, students with back or neck problems will probably find this to be a relatively difficult exercise.

- Start supine, head towards wall, about 12" away.
- Roll backwards and flip the feet up to touch against the wall, toes down.
- Cross one leg under the other and pivot on the upper back, rotating until you can place the soles of both feet against the wall, toes up.
- Repeat 10 times; be sure to practice turning and twisting in both directions!

§4.6. Low Shoot AKA Sit Outs

The solo low shoot drill is unusual in that it aids the participant in transitioning between parterre position and a supine turtle position. While neither 'resting' position is particularly strong in the context of ground fighting, both positions permit the participant to effect a variety of escapes and attacks, or to transition to other, more favorable positions.

- Start in parterre position, face down.
- Pull one knee in up under chest and then extend it

out at roughly 90 degrees, turning hips and rotating into backfall position (now you have sat out).

- Sit back up and turn the hips, pushing the same leg under at 90 degrees and turning the body back into plank, but now turned 180 degrees from start.
- Continue alternating steps above for a complete rotation.
- Repeat 5 times and then switch direction for another set.

§4.7. High Shoot AKA Hip Heist

The purpose of this drill is to develop agility for effecting positional changes during ground fighting.

- Starting from a crab walk position, reach one arm up and across the body, turning the chest 90 degrees while shooting the diagonal leg underneath, so that both chest and hips turn towards the ground.
- Pull the other leg under and through, and reposition the remaining hand to attain a bear walk position, but with the axis of the head rotated 90 degrees from the starting orientation.
- Pick up the second hand and turn the chest back upwards while shooting the diagonal leg underneath, so that both chest and hips turn up away from the ground.
- Reposition the other leg and the remaining hand to regain a crab walk position, but with the body rotated 180 degrees from the starting orientation.

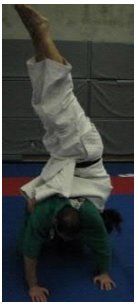
- Switch directions and repeat.

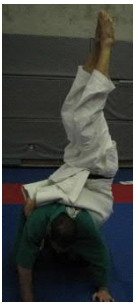
§4.8. Turtle Flip-overs

This partner drill will help build both core and arm strength. Note that with unequally sized partners, the shorter-armed participant may have considerable difficulty completing the drill due to an inability to reach around the larger partner.

- With the uke in turtle position, grasp underhanded with both hands (see first picture below for grip detail) between the elbow and knee for the far lapel of the uniform, gripping tightly with the thumbs in. This will be easier to do reaching from the uke's right towards the left, due to the handedness of the lapel. (In a plain clothes situation, you can try gripping the belly instead, but holding on as you flip over will be considerably more difficult!)

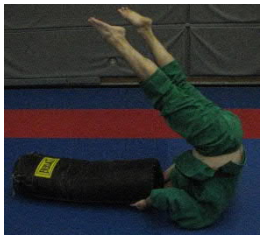
- Jump over the uke into bridge position. The head should end up past and slightly underneath the uke.
- Pulling with both hands, kick off the floor and try to jump back to original position.
- Repeat 5 times and then switch roles.

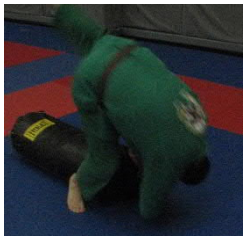




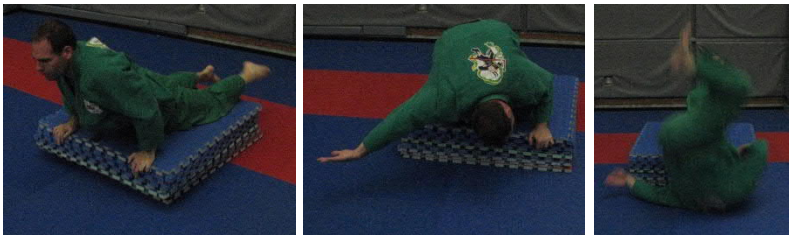
As a solo alternative, this drill can be reconstituted as follows, though this version is considerably less taxing on the core muscles than the partner version:

- Set up a throwing dummy, heavy bag, or 8–12" high pile of mats.
- Lie down supine with the head towards the obstacle, separated far enough so that the hands can comfortably grip the obstacle without bending the arms too much.
- Kip up, pivoting over either shoulder and come down into mount or face fall position atop the obstacle.

- Reverse back to start via somersault, regular roll, posting roll or foot-slap breakfall.
- Repeat 10 times.

§4.9. Side Mount Spins

The purpose of this partner drill is to practice moving smoothly from side mount on one side to side mount on the other.

- With the uke prone, in turtle or parterre position, start out on one side, holding down with chest, ie., in side mount.
- Spin around the uke's head to side mount on the opposite side. Be sure to turn far enough to drop the head-side knee behind the uke's elbow.
- Once the spin and leg motion is smooth, the drill can be augmented by setting arm hooks after the spin, one between the head and shoulder, the other looping underneath the chest.
- Repeat 10 times and switch roles.

§4.10. Kimura Sit-ups.

This partner drill practices the transitions needed to carry out a Kimura arm-bar attack from guard.

- Start by putting the uke in your guard.

- Nage reaches up to grab a wrist with the same-side arm, then does a sit up and vines the opposite arm behind the uke's shoulder/elbow for a figure 4 and the start of a Kimura lock.
- Release and switch to the other side, repeat 10 times and switch roles.

§4.11. Half-Guard Position Flow Drill.

As suggested by the name, the purpose of this partner drill is to encourage flexibility in transitioning among various guard positions.

- Start with uke in parterre, and set a single leg triangle guard – one leg under, the other outside and bent to hook over the first.
- Turn towards inside and move outside leg to half-butterfly position by hooking the uke's thigh.
- Switch back to flat back, pulling other leg up for full butterfly guard.
- Continue turning, and extend the other leg, going to half-butterfly on the other side.
- Finally, release the butterfly and hook on the other leg for triangle on the other side.
- Repeat 10 times and switch roles.

Conclusion

This paper has been targeted at instructors who are teaching groundwork to beginning Yongmudo students. While that audience is undoubtedly an experienced collection of practitioners, hopefully the reader who has made it this far has picked up at least one or two useful ideas to try incorporating in future class sessions.

References

Anderson, Bob. Stretching. Shelter Publications, Bolinas, CA: 3rd Edition, 2000, ISBN# 0936070226.

Arsenault, Al and Joe Faulise. Chin Na in Ground Fighting. Roslindale, MA: YMAA Publication Center, 2003, ISBN# 1886969663.

Fry, Mike. Cardiovascular Training for Wrestlers. Article posted online at http://www.bodybuilding.com/fun/grapgym1.htm Accessed November 30, 2009.

Griffin, L. L., Mitchell, S. A., & Oslin, J. L. Teaching sport concepts and skills: A tactical games approach. Champaign, IL: Human Kinetics, 1997, ISBN# 0880114789

Kesting, Stephan. Assorted documents and media posted online at http://www.grapplearts.com/index.php Accessed November 28, 2009.

Johnson, Dennis A. Wrestling Drill Book. Champaign, IL: Human Kinetics, 1990, ISBN# 0880114010.

Liang, Shou-Yu and Tai D. Ngo. Chinese Fast Wrestling for Fighting. Roslindale, MA: YMAA Publication Center, 1997, ISBN# 1886969493.

Manos, Keith. 101 Wrestling Drills and Games. Coaches Choice Books, 2006, ISBN# 1585189626.

Mitchell, Debby, Barbara Davis and Raim Lopez. Teaching Fundamental Gymnastics Skills. Human Kinetics Publishers, 2002, ISBN# 0736001247.

Mysnyk, Mark, Barry Davis and Brooks Simpson. Winning Wrestling Moves. Human Kinetics Publishers, 1994, ISBN# 0873224825.

Prehn, Paul. Scientific Methods of Wrestling. Champaign, IL: Baily & Himes, 1925.

Scott, Steve. Drills for Grapplers: Training Drills and Games You Can Do on the Mat for Jujitsu, Judo and Submission Grappling. Santa Fe, NM: Turtle Press, 2008, ISBN# 9781934903049.

Tedeschi, Marc. The Art of Ground Fighting. Trumbull, CT: Weatherhill Inc., 2002, ISBN# 0834804964.

Van Vliet, Karli, Demetreos Bourodemos, Meghan Caldwell, & Jason Kerluck. PE352 Wrestling Unit. Posted online at http://www.educ.uvic.ca/Faculty/thopper/wrestling/WrestUnit
Accessed November 29, 2009.

Walker, Rick. Combat Grip Training. Posted online at http://www.dieselcrew.com/articles.php
Accessed November 30, 2009.

Ward, Phillip. Teaching Tumbling. Human Kinetics Publishers, 1997, ISBN# 0873224973.

Watanabe, Jiichi and Lindy Avakian. The Secrets of Judo: A Text for Instructors and Students. Tuttle Publishing, 2001, ISBN# 080481631X.

Welker, Bill, editor. The Wrestling Drill Book. Human Kinetics Publishers, 2005, ISBN# 073605460.

Wrestling Drills posted online at http://www.bodybuilding.com/fun/ss2.htm
Accessed November 28, 2009.