

THROWING A CROSS PUNCH

body movement analysis

GENERAL DESCRIPTION

This paper will analyze the holistic dynamic body movement of a professional boxer's cross punch. I mentioned professional boxer because amateur boxers are fighters that are still in training and have not performed, or have perfected the dynamic explosive movement of this punch.

As mentioned, the cross punch is a holistic dynamic movement that consists of total body synergies. The cross punch is a kinetic wave of energy that begins at your feet, travels superiorly through the legs up towards the hip. The wave of energy, while the core is engaged then travels upward towards the chest and then transfers to the shoulder into an explosive extension movement of arm. The complexity of this movement has multiple levels of phases. Please note: Description of the phases will be explained in an orthodox stance.

PHASES OF MOTION

During phase I, the stance phase, or otherwise known as the fighter's stance will either be at a southpaw position (right hand and right foot forward, leading with right jabs and left cross jabs), or the most common fighting stance called an orthodox position (left foot forward, right foot further back, leading with left jabs and right cross punches). This stance phase consist of mainly isometric contractions. The body must maintain stabilization and mobilization of all joints and muscles. The fighter's arms will be in a flexed position with the right hand

Antonio Srado
NASM-CPT, CES, PES, FNS, MMACS

covering just mid of the jawbone and the left hand covering the temporal area of the skull bone. It is important to note that during this phase the fighter must keep his feet at a plantar flexed standing position; or as most trainers will refer to it as “stay on your toes”. It is also important to note that the fighter must maintain a position whereas the anterior portion of the waistline is positioned away from his opponent, thus not allowing the opponent to engage an attack on the anterior portion of the body.

During phase II, the preparatory phase, the fighter will come into a slight bend at the knee joint that is located toward the posterior portion of the body. Also during this phase, the fighter will produce a majority of the kinetic wave energy needed to execute the power behind the punch. In this phase the body of the fighter will maintain a great amount of isometric contraction with some concentric contraction of the posterior portion of the leg. The anterior portion of the leg will produce minimal eccentric contraction.

In phase III, the movement phase, the body will transfer the kinetic wave energy upward towards the shoulder of the body. This is probably the most complex phase of the movement as a whole. During this phase, it is important to note that precision of the body’s ability to produce the dynamic movement is keen. In other words, the power behind the cross punch is determined through the variations of which the body transfers the kinetic energy. To further explain, this movement begins with the slight bend of the fighter’s knee located to the most rear. The fighter will then extend the right knee while simultaneously rotating the plantar flexed foot about 45 degrees laterally from its original stance

Antonio Srado
NASM-CPT, CES, PES, FNS, MMACS

position. During the foot rotation, the knee will be at its full extension thus transferring the kinetic energy upward towards the hip. The femur then rotates medially at the hip. During this portion of the movement, the fighter will contract his core while still transferring the kinetic energy upward, this time towards the shoulder. While the core is engaged, this phase will end when the fighter rotates the torso while simultaneously anteriorly rotating his right shoulder.

During phase IV, otherwise known as the follow through phase, the fighter begins this phase with an anteriorly rotated right shoulder. From this position, the planter-flexed foot rotated laterally, the hip is at a left transfers pelvic rotation, the torso rotated left-laterally, and the fighter's kinetic energy is up towards the shoulder. At this phase while the kinetic energy is at the upper portion of the body, the fighter then contracts the right latissimus dorsi, the mid and upper trapezius, the pectoral major muscle and the anterior deltoid while explosively extending the arm, thus transferring the kinetic energy out to the fist and into the punch. The fighter's right leg will produce an instep to maintain balance while the explosive movement occurs.

Phase V would be considered the recovery phase. During this phase, the fighter returns to his normal fighting stance: in this case, the orthodox stance. This movement consists of maintaining the right foot in a plantar-flexed position while bringing the foot rear of his left foot. The fighter's hip will rotate right laterally bringing the waistline to its original position away from the opponent who is face to face. The fighter's arm returns to a flexed position to block the jawbone area thus not allowing his opponent to attack his face.

DETAILED PHASES OF MOTION

Phase I	Motion	Agonist Muscles	Stabilizing Muscles	Joints Involved
Fighter's Stance – otherwise known as an Orthodox stance or Southpaw stance.	No Motion – This is considered a starting position.	<p>Because the muscles that are engaged during this phase are mainly isometric, agonist muscles that are involved during phase I consists to the following:</p> <ol style="list-style-type: none"> 1. Quadriceps Complex: Rectus Femoris, Vastus Medialis, Vastus Intermedius, Vastus lateralis 2. Biceps Brachii 3. Anterior/Lateral Deltoid Muscles 4. Gastrocnemius, Soleus Muscles 5. Flexor Muscles of Wrist and Hand Joints: Flexor digitorum superficialis, flexor digitorum profundus, flexor pollicis longus 	<ol style="list-style-type: none"> 1. Trapezius Muscle (Upper/Lower) 2. Serratus Anterior 3. Gluteus Medius/Maximus 4. Tensor Fasciae Latae 5. Iliacus 6. Psoas 	<ol style="list-style-type: none"> 1. Glenohumeral joint 2. Humeroulna, Radiohumeral Joints 3. Symphysis Pubis 4. Sacroiliac Joint 5. Tibiofemoral Joint

Phase II	Motion	Agonist Muscles	Stabilizing Muscles	Joints Involved
Preparatory Phase	Fighter comes into a slight bend at the knee joint that is located toward the posterior portion of the body.	<p>During the preparatory phase, the fighter's agonist muscles are those of which concentrically contract. In this matter it will be the following:</p> <ol style="list-style-type: none"> 1. Hamstring Complex/Knee Flexors: Bicep Femoris, Popliteus, Semi-membranosus, Semi-tendinosus 2. Gastrocnemius, Soleus muscles 3. Flexor Muscles of Wrist and Hand Joints: Flexor digitorum superficialis, flexor 	<ol style="list-style-type: none"> 1. Trapezius Muscle (Upper/Lower) 2. Serratus Anterior 3. Gluteus Medius/Maximus 4. Tensor Fasciae Latae 5. Iliacus 6. Psoas 	<ol style="list-style-type: none"> 1. Glenohumeral joint 2. Humeroulna, Radiohumeral Joints 3. Sacroiliac Joint 4. Tibiofemoral Joint

digitorum profundus, flexor pollicis longus
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Phase III	Motion	Agonist Muscles	Stabilizing Muscles	Joints Involved
Movement Phase	<p>The fighter will have a slight bend of the knee located to the most rear. He will then extend the right knee while simultaneously rotating the plantar flexed foot about 45 degrees laterally from its original stance position. During the foot rotation, the knee will go to its full extension thus transferring the kinetic energy upward towards the hip. The femur then rotates medially at the hip. The fighter's core will be contracting while still transferring the kinetic energy upward, this time towards the shoulder. While the core is engaged this phase will end when the fighter rotates the torso while simultaneously, anteriorly rotating his right the shoulder.</p>	<p>There is a substantial amount of muscle activity during the movement phase. In this phase, there will be a concentric muscle action of the following muscles:</p> <ol style="list-style-type: none"> 1. Gastrocnemius, Soleus 2. Tensor Fasciae Latae 3. Hamstring Complex/Knee Flexors: Bicep Femoris, Popliteus, Semi-membranosus, Semi-tendinosus 4. Adductor Complex: Brevis, Longus 5. Peroneus: Longus, Brevis, Terius 6. Transverse Abdominis 7. Internal oblique 8. Pectoralis Minor 9. Anterior Deltoid 10. Triceps Brachii 11. Flexor Muscles of Wrist and Hand Joints: Flexor digitorum superficialis, flexor digitorum profundus, flexor pollicis longus 	<ol style="list-style-type: none"> 1. Trapezius Muscle (Upper/Lower) 2. Serratus Anterior 3. Gluteus Medius/Maximus 4. Tensor Fasciae Latae 5. Iliacus 6. Psoas 	<ol style="list-style-type: none"> 1. Glenohumeral joint 2. Humeroulna/Radioumeral Joints 3. Symphysis Pubis 4. Sacroiliac Joint 5. Tibiofemoral Joint

Phase IV	Motion	Agonist Muscles	Stabilizing Muscles	Joints Involved
Follow Through Phase (The Actual punch)	<p>The fighter begins this phase with an anteriorly rotated right shoulder. From this position, the planter-flexed foot is rotated laterally, the hip is at a left transfers pelvic rotation, the torso rotated left-laterally, and the fighter's kinetic energy is up towards the shoulder.</p>	<ol style="list-style-type: none"> 1. Flexor Muscles of Wrist and Hand Joints: Flexor digitorum superficialis, flexor digitorum profundus, flexor pollicis longus 2. Wrist Extensor: Extensor carpi ulnaris 3. Extensor carpi radialis brevis, 	<ol style="list-style-type: none"> 1. Trapezius Muscle (Upper/Lower) 2. Serratus Anterior 3. Tensor Fasciae Latae 4. Iliacus 5. Psoas 	<ol style="list-style-type: none"> 1. Glenohumeral joint 2. Humeroulna/Radioumeral Joints 3. Symphysis Pubis 4. Sacroiliac Joint 5. Tibiofemoral Joint

<p>While the kinetic energy is at the upper portion of the body, the fighter then contracts the right latissimus dorsi, the mid and upper trapezius, the pectoral major muscle and the anterior deltoid while explosively extending the arm, thus transferring the kinetic energy out to the fist and into the punch.</p>	<p>Extensor carpi radialis longus 4. Triceps Brachii 5. Anterior, Lateral Deltoid 6. Upper, Mid Trapezius 7. Pectoralis Major, Minor 8. Latissimus Dorsi 9. Gastrocnemius, Soleus 10. Adductor Complex: Brevis, Longus 11. Peroneus: Longus, Brevis, Terius 12. Gluteus Medius/Maximus 13. Hip Flexors: Sartorius, Iliacus, Psoas major, and minor</p>
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Phase V	Motion	Agonist Muscles	Stabilizing Muscles	Joints Involved
Recovery Phase (Return to Orthodox Stance)	<p>This movement consists of maintaining the right foot in a plantar-flexed position while bringing the foot rear of his left foot. The fighter's hip will rotate right laterally bringing the waistline to its original position away from the opponent who is face to face. The fighter's arm returns to a flexed position to block the jawbone</p>	<p>During this phase the body returns to phase II. Some movements consists of hip and knee flexion as well as flexion of the elbow to propose the blocking maneuver.</p> <p>1. Hip Flexors: Rectus Femoris, Vastus Medialis, 2. Biceps Brachii 3. Anterior/Lateral Deltoid Muscles 4. Gastrocnemius, Soleus Muscles 5. Flexor Muscles of Wrist and Hand Joints: Flexor digitorum superficialis, flexor digitorum profundus, flexor pollicis longus 1. Hamstring Complex/Knee Flexors: Bicep Femoris, Popliteus,</p>	<p>1. Trapezius Muscle (Upper/Lower) 2. Serratus Anterior 3. Gluteus Medius/Maximus 4. Tensor Fasciae Latae 5. Iliacus 6. Psoas</p>	<p>1. Glenohumeral joint 2. Humeroulna/Radioulnal Joints 3. Symphysis Pubis 4. Sacroiliac Joint 5. Tibiofemoral Joint</p>

Semi-membranosus, Semi-tendinosus

MUSCLES TO TARGET TO ENHANCE FUNCTION AND PERFORMANCE OF THE FIGHTER'S CROSS PUNCH

Because the cross punch is considerably a very dynamic explosive movement, the muscles to target is viewed on a holistic level. To explain, albeit the movement of the punch involves the muscles of the chest, shoulder, and arms, the kinetic energy is produced in the inferior portion of the body and thus consists of the hip, and leg muscles. However, movement also includes muscle action of the abdomen, back, chest, and shoulder muscles. Below, I will provide a list of major muscles that will assist on enhancing the holistic function and performance of the fighter's cross punch:

UPPER BODY	
1. Pectoralis Major	2. Latissimus Dorsi
3. Transverse Abdominis	4. External Oblique
5. Anterior/Lateral Deltoid	6. Upper/Mid Trapezius
LOWER BODY	
7. Rectus Femoris/Biceps Femoris	8. Tensor Fasciae Latae
9. Gluteus Maximus/Medius	10. Gastrocnemius/Soleus

EXERCISES THAT WILL BEST IMPROVE THE FIGHTER'S CROSS PUNCH

I believe that when training to improve the fighter's cross punch we must focus on the transferring of the kinetic energy through the body. To explain such theory and as I mentioned earlier in the writing, the power output of the punch varies greatly upon the production of kinetic energy. To briefly explain, the majority of the production of kinetic energy is initiated at the feet of the fighter. It

Antonio Srado
 NASM-CPT, CES, PES, FNS, MMACS

is then transferred upward towards the hip, onto the shoulder, and out to the arm, reaches the fist, into the punch. During the occurrence of the transferring of energy, the body loses kinetic power; as a consequence, by the time it reaches the fist the punch may be or may not be detrimental towards the opponent. Yes, the more mass the fighter has, the more the probability of a heighten amount of kinetic output. However, the movement and precision of rotations all can amount to the power output. To go no further into detail, I will introduce a series of exercises that will assist on improving the fighter's cross punch:

UPPER BODY (STRENGTH)		UPPER BODY (POWER)	
1. Chest Press		1. Plyometric Pushup	
2. Sit-up		2. Mountain Climber	
3. Pull Up		3. Medicine Ball Slams	
4. Rotating Crunch		4. Supine Bicycle	
5. Shoulder Shrugs/Press		5. Kettlebell Push press	
6. Frontal/Lateral Raises		6. Low-weighted Shadow Boxing	
LOWER BODY (STRENGTH)		LOWER BODY (POWER)	
7. Barbell Squats		7. Squat Jumps	
8. Barbell Hip Thrust		8. Supine Bridge	
9. Hanging Kettlebell Calf-Lift		9. Calf Lift	
10. Kettlebell Step ups		10. Plyometric Lunges	
STRETCHING (DYNAMIC)		STRETCHING (STATIC)	
1. Jumping Jacks		1. Bent-over Hamstring Stretch	
2. Butt Kicks		2. Figure-4 Stretch	
3. Knee-ups		3. TRX Back Stretch	
4. Plyo-Squat		4. Butterfly Stretch	
SELF MYOFASCIAL RELEASE			
<p>I would highly recommend that boxers incorporate a self-myofascial release (SMR) technique into their workout. This is suggested because a layer of fascia surrounds the muscle fiber. This layer of fascia could be detrimental towards the boxer's ability to reach full range of motion, and thus not allowing the boxer to perform his best when punching; consequently shortening his reach. The simplest technique to SMR is called foam rolling. Below, I will provide a link to a website that'll show you techniques to stretch using SMR.</p>			