



A Philosophy and Ethic for Martial Training

3rd Degree Black Belt Thesis

Written by
Dennis Bechly

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Outline

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Introduction

A Philosophy and Ethic for Martial Training, 3rd Degree Black Belt Thesis, is a principled examination of the notion of inducing pain and injury. The focus will be on the transmission of **Hurt** or **Harm** using martial art skill sets tempered by the influence of philosophical, social, moral and ethical considerations. To be sure, the legal implications of any action should be taken into consideration as well, but that will not be the emphasis of this discussion. This thesis is not intended as a “how-to” manual. It will present concepts and ideas that martial artists should consider as they train and form their philosophy and ethics of an art.

The thesis starts with the definition of the concepts of **Hurt** and **Harm** and provides a categorization for the severity of each. The philosophical and ethical mind set of a martial artist is closely linked to any action that is carried out. Unless a person is operating at a purely instinctual level, a martial artist should strive to be in control of the many options and opportunities that present themselves during a confrontation. The variations and consequences discussed as examples will make use a technique from Ed Parker’s American Kenpo. They may be used as a guide for the analysis of any technique and how its effectiveness can be evaluated, manipulated and applied during a given confrontation.

Emphasis throughout this thesis is solely on the application of martial art skills for self-defense purposes. Self-defense is the right of any individual to protect oneself from abuse and harm. Everyone, especially those with training in the martial arts, should understand that the right of self protection comes with the obligation to respond appropriately to a given situation.

The varying levels of severity of **Hurt** or **Harm** should be under the control of a skilled martial artist. Ed Parker’s American Kenpo techniques, in their ideal form, are designed to work in a well thought out, practical and specific manner. Each movement is constructed to illicit a particular response which allows one action to flow to the next. It is always up to the individual martial artist to determine the levels of force and targets that are appropriate for any given situation. A desired outcome is grounded in the martial artist’s attitude, ethic and skill set. Control in all levels of circumstances should be the ultimate goal of any martial artist.

Defining Hurt and Harm

The following definitions are taken from The American Heritage Dictionary of the English Language.

Hurt v. 1. To cause physical damage or pain; to make suffer; to injure, wound. 2. To distress.

Harm v. 1. To damage; injure; impair.

Hurt, for this discussion, will have the limited definition of causing discomfort, pain or superficial injury. Pain is a very subjective experience. Each individual has their own tolerance for pain based on physical, emotional and psychological tendencies. Additionally, external chemical influences, i.e. drug use, can greatly affect the experience and tolerance of pain. The medical community has adopted a comparative pain scale from 0 to 10 to allow patients to describe their pain.

Comparative Pain Scale		
	0	No pain. Feeling perfectly normal.
Minor Does not interfere with most activities. Able to adapt to pain psychologically and with medication or devices such as cushions.	1 Very Mild	Very light barely noticeable pain, like a mosquito bite or a poison ivy itch. Most of the time you never think about the pain.
	2 Discomforting	Minor pain, like lightly pinching the fold of skin between the thumb and first finger with the other hand, using the fingernails. Note that people react differently to this self-test.
	3 Tolerable	Very noticeable pain, like an accidental cut, a blow to the nose causing a bloody nose, or a doctor giving you an injection. The pain is not so strong that you cannot get used to it. Eventually, most of the time you don't notice the pain. You have <i>adapted</i> to it.
Moderate Interferes with many activities. Requires lifestyle changes but patient remains independent. Unable to adapt to pain.	4 Distressing	Strong, deep pain, like an average toothache, the initial pain from a bee sting, or minor trauma to part of the body, such as stubbing your toe real hard. So strong you notice the pain all the time and <i>cannot completely adapt</i> . This pain level can be simulated by pinching the fold of skin between the thumb and first finger with the other hand, using the fingernails, and squeezing real hard. Note how the simulated pain is initially piercing but becomes dull after that.
	5 Very Distressing	Strong, deep, piercing pain, such as a sprained ankle when you stand on it wrong or mild back pain. Not only do you notice the pain all the time, you are now so preoccupied with managing it that your normal lifestyle is curtailed. Temporary personality disorders are frequent.
	6 Intense	Strong, deep, piercing pain so strong it seems to partially dominate your senses, causing you to think somewhat unclearly. At this point you begin to have trouble holding a job or maintaining normal social relationships. Comparable to a bad non-migraine headache combined with several bee stings, or a bad back pain.
Severe Unable to engage in normal activities. Patient is disabled and unable to function independently.	7 Very Intense	Same as 6 except the pain completely dominates your senses, causing you to think unclearly about half the time. At this point you are effectively disabled and frequently cannot live alone. Comparable to an average migraine headache.
	8 Utterly Horrible	Pain so intense you can no longer think clearly at all, and have often undergone severe personality change if the pain has been present for a long time. Suicide is frequently contemplated and sometimes tried. Comparable to childbirth or a real bad migraine headache.
	9 Excruciating Unbearable	Pain so intense you cannot tolerate it and demand pain killers or surgery, no matter what the side effects or risk. If this doesn't work, suicide is frequent since there is no more joy in life whatsoever. Comparable to throat cancer.
	10 Unimaginable Unspeakable	Pain so intense you will go unconscious shortly. Most people have never experienced this level of pain. Those who have suffered a severe accident, such as a crushed hand, and lost consciousness as a result of the pain and not blood loss, have experienced level 10.

In general, pain itself is not the cause of any injury to an individual, although, extreme pain may result in a loss of consciousness. This may be followed by a fall which can then end in an injury. Pain of this intensity is usually only brought about by severe trauma or the overstimulation of nerve complexes.

Harm is equated to some form of physical damage. It is the application of martial art skills to cause injury to an adversary. There are no formal standards for the degrees of harm, but some general guidelines can be put forth to differentiate varying levels. *Superficial injuries* are injuries that normally heal quickly and do not require any outside medical attention. These injuries would include such things as contusions, abrasions, and strains. The differentiation of **Hurt** and **Harm** become blurred at this level. It is rare to inflict a moderate level of pain without also producing some form of injury. *Minor injuries* are incrementally more serious and usually will require some form of outside medical attention to insure that they will heal properly. Full recovery from these injuries is usually expected. These injuries would include such things as lacerations, minor fractures, sprains and tears. *Major injuries* are much more serious. Although not life threatening, these injuries will require major medical attention with possible hospitalization and/or surgery. Recovery from these types of injuries can take a great deal of time and may require some form of rehabilitation. There is no guaranty of a full recovery. Permanent physical disability is a possible outcome. These injuries would include such things as major fractures, dislocations, ligament tears, joint damage, organ trauma and minor brain trauma. *Catastrophic injuries* are the most severe form of harm. Injuries of this type result in coma, brain damage, paralysis, immediate life threatening circumstances or even death. These injuries would include major brain trauma, fracture of the larynx, hypoxia, spinal cord trauma, organ failure and major external or internal hemorrhaging.

The application of **Hurt** or **Harm** in many cases is in the control of the individual. **Hurt** can be used as a control mechanism or deterrent without having to inflicting a higher level of injury to an opponent. A confrontation that escalates to the physical stage is seldom serious enough to warrant the use of force with enough intensity to cause major injury. In many cases, a limited use of force is sufficient to control the situation. There are those times, however, where pain is not a sufficient deterrent. Circumstances may be present that inhibit an assailant's realization of pain, i.e. adrenaline, drug use, heavy clothing or even body armor. An attacker's sole intent may be to inflict bodily harm without regard to his own well being. There may be a situation with multiple assailants, where spending too much time on one attacker will only open opportunities for another or give a previously injured assailant time to recover. In those instances, the only way to successfully defend against the attack is to cause debilitating **Harm** to the attacker, or in other words, produce injuries severe enough to prevent the attacker from continuing any action.

Philosophy and Ethics

What is the purpose of studying and practicing the martial arts? At their most fundamental level, the martial arts are skill sets used for physical combat. Today, unless you are involved in military operations, the skill sets that the martial arts provide tend to emphasize physical fitness, discipline, sport and self-defense.

Conditioning the body to withstand punishment is neither a practical nor intelligent pursuit in today's world. Except for those who choose to participate in full contact sporting competitions the advantages of that type of toughening of the body is limited and certainly has its own long term medical consequences. Even then, in most competitions, measures are taken to avoid serious and permanent injury. For the vast majority of martial art participants, self preservation and protection are the key goals.

The martial arts are designed for proficiency in physical combat. Thankfully today, a martial artist finds himself in a self-defense situation only on very rare occasions. The vast majority of confrontations never fall into the category of "life threatening". In 2010 the ratio of violent attacks to murders was about 100 to 1. Yet many self defense techniques are designed to dispatch an adversary quickly and decisively with little regard to the physical consequences to the attacker. Everyone obviously has the right to protect themselves from harm. But with that right, they also have an obligation both legally and ethically to control how far they take their defensive actions. It should be understood that defending oneself does not include the right to carry that defense into the realm of punishing an aggressor for his actions. That aspect is best left with the civil and legal authorities.

Morihei Ueshiba, the founder of Aikido, spoke of "budo" as a way of establishing harmony. His interpretation of *bu* has the meaning of "stopping weapons". That is different from the usual English translation into "war". The original intent of budo was to protect people from the use of weapons, not as a primary art of combat. Ed Parker, the founder of American Kenpo, wrote this about his philosophy on the study of the martial arts, "When physical and mental discipline becomes one, spiritual discipline becomes automatic. Instead of welcoming trouble, you shun it, not because you are afraid of an individual, as you are afraid of what you can do to that individual." Training in the martial arts should not be at path to the philosophy of "mutual destruction". Instead, that training should lead to an awareness of the potentialities of devastating consequences and thus lead the practitioner to a philosophy more in line with "mutual preservation".

There is an ever increasing attitude of competition in the world today. A "sport" attitude of requiring there be winner and loser is creeping into many areas of business, politics and society in general. Competitions abound in the martial arts to claim the "ultimate" style or competitor. It is no wonder human ego quickly comes into play in any confrontational situation. Soon the feelings of being wronged or challenged take hold and a retaliatory mind set follows. It is hoped that the training a martial artist experiences provides the discipline, confidence and self-esteem necessary to overcome such feelings. The need to prove ones worth is no longer a requirement for the satisfaction of the ego. It

has already been proven through the physical and mental discipline of training in the martial arts.

Many classical martial arts teach a philosophy of peacefulness and strive for harmony of body, mind and spirit. There is a healthy respect for life and for how to treat another individual. Without that respect, the pursuit of the martial arts becomes a conquest of the strongest or most skilled. It quickly devolves into the philosophy of, "It's not who's right but who's left that counts." Martial artists should hone their skills but pursue an internal peace that extends to the external world. They should train intently to stay safe in dangerous circumstances but be mindful of the potential consequences there are in executing a technique sequence and adjust accordingly to achieve the desired outcome. Even if legally justified to do more, their ethics should be the guide to do only as much as the aggressor makes necessary.

If martial artists are to observe an ethical code, why do they train with such intensity and ferociousness? Simply answered, it pays to be ready. There may be a circumstance where life or death is on the line and it would do well to already have the skills required. There is a familiar coach's edict, 'you should practice the way you want to play.' One interpretation of that statement has the meaning that it is much easier to step down the intensity than it is to step it up to something that has never been trained. Diligently learn the techniques of the style as dictated at full intensity but it would be appropriate to prepare less **harmful** alternatives and practice those as well.

Execution and Analysis

The ideal goal in any confrontation is to leave without ever having to take any physical action. When that is not an option, the focus should shift to getting out of there without being personally injured and leaving the adversary with the least amount of harm. How that transpires certainly depends on the circumstances of the confrontation, the number of participants involved and the degree of danger. The level of confrontations can have a vast range; examples of which run from a belligerent brother-in-law getting out of hand at the family reunion to a murderous attempt by multiple armed thugs. This wide range of circumstances justifies a commensurate wide range of actions. The results of those actions will vary in the degree of hurt or harm imposed on an adversary in order to resolve the confrontation.

Ed Parker's American Kenpo techniques, categorized based on specific methods of attack, were created in a well thought out, practical manner designed to quickly and decisively end an assault. Most of the techniques with the addition of their extensions, if carried out to their full extent, will end a confrontation leaving an assailant with a significant degree of **harm**. Proficiency in a technique must include an awareness of the principles involved in its execution and the ability to control every movement. Inside the execution of any technique are a myriad number of possibilities. Ed Parker's American Kenpo includes a concept called the *Equation Formula* which provides for the spontaneous modification of any technique to adapt to a particular set of circumstances. The formula allows a more conclusive basis for negotiating alternate actions. For any given base, whether it is a single move or a series of movements, there are the options to; (1) prefix it – add a move or moves before it; (2) suffix it – add a move or moves after it; (3) insert – add a simultaneous move with the already established sequence; (4) rearrange – change the sequence of moves; (5) alter – the target, weapon or both; (6) adjust – range, angle or both, (7) regulate – speed, range or both; (8) delete – exclude a move or moves from the sequence. Thus any technique can be modified and adapted to fit whatever context is needed to achieve a successful outcome. It is up to the individual to determine what that outcome should be.

An examination of a simple technique will provide an example that can be used as a guide to analyze how any technique can be adjusted, controlled and modified to suit the circumstances and obtain a desired outcome.

Delayed Sword is a technique used to defend against a right handed push or grab to the left shoulder. As the opponent attacks; (1) Left step back into a Right Neutral Stance while executing a Right Inward Block to the opponent's arm. In addition, the Left Hand should come up to check the opponent's right wrist. (2) Right Front Snap Kick to the opponent's groin. (3) Planting the right foot forward, execute a Right Outward Handword to the opponent's neck. This simple technique is made up of three basic movements but can be reanalyzed to include numerous possibilities.

If the push attack is committed and the defender's timing is correct, the initial defensive movement of stepping back will move the target of the left shoulder out of the way, riding with the force. Without any other movements employed, the push passes the target harmlessly with a possibility of causing the attacker to lose balance and end up on the floor. No effect on the defender and minimal harm to the attacker except for a bruised ego.

If the attack is more of a grab or the push is not fully committed, the additional defensive move of the Inward Block can be used for multiple effects. It can be used simply to keep the extending hand from making full contact with shoulder. The block can also be directed to specific targets such as the top of the bicep muscle itself causing a contusion or the median or ulnar nerves located at the top distal or inside distal of the bicep respectively causing a significant level of pain and a possible temporary loss of motor function.

If the attack is aggressive, the second move of this technique comes into play. The Right Front Snap Kick is a retaliatory counter to the initial attack meant to disrupt any further aggressive action of the attacker. Targeting the groin with the kick at a minimum causes a great deal of pain with possible tissue damage, shock, loss of breath, nausea, vomiting or even unconsciousness. Altering the targeting of the kick to the inside of the opponents right leg presents other vulnerable areas with different outcomes. A kick to the leg will disrupt the opponents balance thwarting continued aggressive action. The inside of the thigh offers its muscles for contusions and the Femoral or Saphenous Nerves for producing severe pain. Lowering the kick to the level of the knee opens that major joint to any number of minor or major injuries from dislocating the patella to strains and sprains of the joints ligaments.

The third move of this technique is the finishing strike of this encounter. Depending on the position of the opponent, the Right Outward Handword can be executed to produce any number of outcomes. Following the arm to a target, the handword will find the Brachial Plexus where the shoulder and neck meet producing pain and temporary loss of motor function in the arm. A slight modification in trajectory will allow for a strike to the Carotid Sinus producing a Neurovascular Knockout with its sudden loss of consciousness. The angle of entry could be changed for a more aggressive strike to the Larynx with a crushing strike that could cause catastrophic injury if a fracture occurs. A completely new target could be chosen depending on the position of the opponent. If he is in an upright position a strike to the clavicle could cause a fracture. If the kick caused the opponent to bend forward, the cervical vertebrae present as targets.

This analysis is by no means exhaustive of the variations and demonstrates that even the simplest of techniques can be filled with a vast range of alternatives. The execution of a technique is not written in stone and its formulation is only the skeleton of the possibilities. All of the choices are dependent on the mind set, skill and philosophy of the martial artist executing the technique. Training to be aware of the myriad of options opens the door to more spontaneity while still maintaining full control of body and spirit.

Control

The American Heritage Dictionary of the English Language contains the following definition of the word “control”; –v 1. To exercise authority or dominating influence over; direct or regulate. 2. To hold in restraint; to check. –n 1. Authority or ability to regulate, direct, or dominate. 2. A restraining act or influence; a curb.

Control has various connotations dependent on the rolls of assailant or defender. In either case, control could be considered the key aspect of any confrontation.

What is the primary goal of an assailant? It is to achieve a desired outcome, whether it would be intimidation, compliance, assault, robbery or rape. Achieving that desired outcome requires that some level of control be exerted on the victim. The means used to exert control are made up of many different combinations of verbal or physical actions. They may include increasing the vocal volume, intimidating facial expression, physical presence, actual physical restraint and assault, or the use of weapons. These means could also make use of factors such as control of the environment and the element of surprise. In all instances, the assailant is working to control the emotional, mental and physical aspects of the situation. With those factors under his control, compliance of the victim is achieved.

Just as it is an assailant’s intent to seize control of a confrontation, control is the key for defense. If the defender does not relinquish control to the attacker, the defender will maintain a primary influence over the outcome.

The ability to maintain control is one of the main reasons martial artists put in so many hours of practice and training. To be sure, they are training their minds and bodies to be able to perform particular techniques. But in addition, they should be training to be able to execute those techniques under circumstances much more stressful than those experienced in a common session at the dojo. Those circumstances will also be encumbered by unfamiliar environments, rapidly changing events and adrenaline bursts far exceeding the norm.

The physical aspects of maintaining control are extremely important. If control is not maintained while performing physical movements there is a much smaller chance that those movements will produce worthwhile results. Wild, unfocused actions usually result in nothing more than wasted effort. Control of balance, positioning and movement are all essential. An attack is an effort to assert control. A proper defense will have the ability to neutralize the attack and position the defender to assume control. Physically taking control of an opponent’s zones of height, width and depth inhibits his ability to continue the engagement and puts the defender in control of any further actions.

Breath is an often overlooked aspect of physical control. Respiration at its basic level provides the body with its essential oxygen requirements and expels waste carbon dioxide to facilitate the body’s proper function. The process of breathing can be affected by

many factors. Physical conditioning and stamina have a great effect on the requirements of breathing. As physical exertion increase, the body adjusts its breathing tempo and volume to make sure its needs are met. This is all automatic without any forethought of the participant.

In a confrontation or other dangerous situation, surprise, fear, panic and anger will cause the body to release a large amount of adrenaline into the system. The pulse will quicken and the level of respiration will increase. This is the so called “flight or fight” response. It is preparing the body to escape or engage in battle. There are some disadvantageous reactions that can take place as a result of that adrenaline burst; loss of fine motor skills, a tunneling effect of the vision and a possible moment of “freezing” and not being able to react.

Breath control can have a very positive effect on the above reactions. A conscious effort to adjust the pace and volume of breaths using abdominal breathing techniques can be used to control the adverse effects of the adrenaline bursts. Deep, slow, relaxed breaths help clear the mind, prevent hyperventilation, slow the pulse and restore focus to the current situation.

Maintaining control of the mind, emotion and spirit is as important to a martial artist as physical control. It certainly takes a great deal more time and effort to master. The ultimate goal is to have a mind clear of extraneous thoughts and engaged in total awareness of the moment. Clearing the mind discards the distractions of fear, anger and doubt. Fear and anger are emotions that trigger a physiological response to the body. By controlling how the mind recognizes and handles those emotions, the effects of their physiological responses can be reduced. Doubt creates hesitancy. Reactions are slowed because there is no true belief in a successful outcome. Clearing the mind rids it of extraneous plans of action or preconceived strategies so that the mind and body are free to react spontaneously to any situation. There are no surprises because nothing is expected. Focus cannot be broken because the mind is totally aware. The mind does not dwell on what just did or didn't happen. It does not worry about what is going to happen next. The mind is in the moment and accepts what is there.

The ability to achieve and maintain control physically, mentally and emotionally in any situation is to retain the ability to influence, direct and dictate an outcome.

Conclusion

Hurt vs. Harm. There are always choices to be made and those choices ultimately depend on the individual performing the actions. The philosophical and ethical mind set of a martial artist is closely linked to the actions that are carried out.

This thesis is an examination of inducing **hurt** and **harm** tempered by the influence of philosophical, social, moral and ethical considerations. It is hoped that the concepts and ideas presented here will serve as a basis upon which martial artists can formulate their own individual philosophy and ethics to use as a guide in the execution of their art.

Most altercations do not fall into the realm of “life or death” situations. Though it is certainly correct to train intently for worst case scenarios, it should be understood that a martial artist must be in control of the art and retain the ability to choose an appropriate amount of force for every situation. The discipline of body and mind allows spiritual discipline to become automatic. Ego is no longer a governing factor for a martial artist’s motivations. External proof of a practitioner’s self worth is no longer a requirement. It has already been proven through the discipline of martial training.

Any of an art’s techniques can be examined and analyzed to discover a myriad of possibilities and variations that can be achieved. The execution of any variation is ultimately guided by the skill, mind set and ethic of the practitioner. With a realization of all of the possibilities the door is opened for the spontaneous adaptation to any situation.

Control of body, breath and mind are the end result of disciplined training in the martial arts. It takes a great deal of time and effort to master even one. A martial artist must develop a moral and ethical code that never diminishes the art and provides a guide to use on the long journey.

Appendix

Definitions and Medical Terms

Many times there is confusion and misunderstandings concerning the nomenclature used to explain injuries. In order to get a better understanding of the types and degrees of injuries that can occur in the martial arts, knowledge of the common definitions and medical terms that are used to describe such injuries is very useful.

Abrasions (grazes)

Abrasions are superficial wounds in which the topmost layer of the skin (the epidermis) is scraped off.

Anterior

Front.

Concussion

Concussion is defined as trauma-induced, transient disruption of brain activity. It is suggested that it involves a complex cascade of trauma-induced chemical and metabolic events. Rotational forces can cause shearing stresses across brain cells causing damage, but concussion injuries may also involve fluctuations in intracerebral pressure.

Concussion symptoms can include unconsciousness, headache, nausea, visual disturbances, amnesia, cognitive disturbances, emotional outbursts, loss of coordination, and trouble with balance. The symptoms correlate with the area of the brain that is injured. In general, most adults require 7 to 10 days for recovery from a concussion, but symptoms can last for weeks.

The most dreaded complication of a concussion is called second impact syndrome. A second traumatic injury to the brain while it is still healing from a previous concussion can cause rapid cerebral edema, brain stem herniation and death.

Contusions

Contusions are defined as trauma-induced damage to soft tissues. These are more commonly identified as “bruises”. Contusion can involve capillaries at the level of skin, subcutaneous, muscle or bone. Trauma to these tissues can cause damage and breakage of small blood vessels which allow blood to seep into the surrounding tissues resulting in the characteristic “black and blue” coloration. Most contusions will heal on their own in 1- 2 weeks. Muscle contusions can cause significant injury to muscle cells and are similar to Grade 1 muscle strains. Mild injury to a bone can cause micro fractures and are classified as a bone contusion or a “bone bruise”.

Crepitus

Crepitus is a term to describe the grating, crackling or popping sounds and sensations experienced under the skin and joints.

Dislocations

Dislocations are a separation of two bones where they meet at a joint. Dislocation may involve additional ligament, vascular or nerve damage.

Distal

Located far from a point of reference such as an origin, point of attachment, or midline of the body.

Ecchymosis

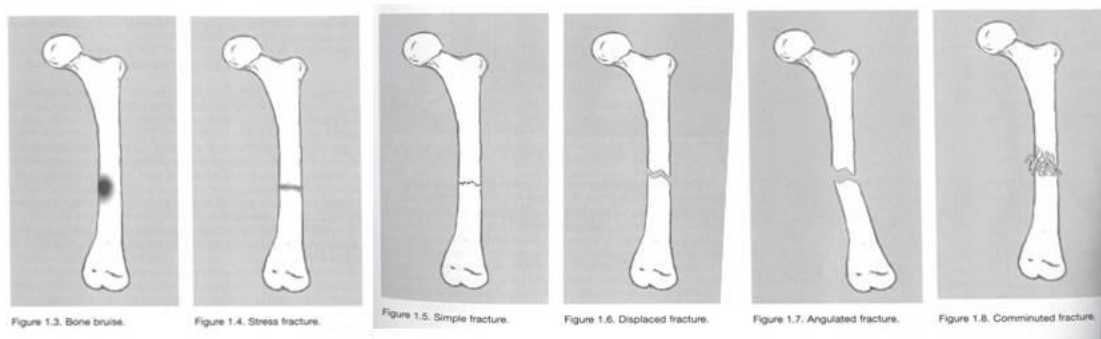
Ecchymosis is the medical term for a purplish, flat bruise larger than 1 cm that occurs when blood leaks out into the top layers of skin.

Edema

Swelling; an accumulation of fluids in tissue.

Fractures

A fracture is a medical condition in which there is a break in the continuity of a bone. Fractures can be caused by trauma or chronic overuse. The nomenclature of fractures depends on the type of fracture.



[Fig 1] Types of Fractures

Bone Contusion: Trauma to a bone resulting in micro fractures (Bone Bruise)

Stress fracture: Chronic overuse causes a bone to become progressively weaker due to the development of micro fractures. If left unchecked these small fractures will coalesce into a larger fracture.

Simple/Closed: Fracture line transversing the bone

Displaced:	Fractured bones are separated
Angulated:	Fractured bones are no longer in alignment
Comminuted:	Fracture with multiple bone fragments
Compound/Open:	Broken bone penetrates the skin
Avulsion:	Ligament separates from bone pulling a bone fragment with it

Hematoma

A hematoma is defined as a localized collection of blood outside the blood vessels, usually in liquid form within the tissue.

Hemorrhage

A hemorrhage is the loss of blood (bleeding) from ruptured blood vessels.

Incisions or incised wounds

Incised wounds are caused by a clean, sharp edged object such as a knife, razor or glass splinter.

Lacerations

Lacerations are irregular tear-like wounds caused by some blunt trauma. The term is commonly misused in reference to incisions.

Myositis Ossificans Traumatica

Myositis ossificans is a calcium formation in an injured muscle. It is a complicated injury that may require extensive healing time and possible surgical removal of calcium deposits. Risk factors include repeated trauma to an injured muscle, aggressive stretching of a muscle contusion and premature strength training of a muscle contusion.

Pain

“Pain is defined as an unpleasant sensory and emotional experience, which is associated with actual or potential tissue damage, or is described in terms of such damage” is the strict scientific definition that was given to pain by the International Association of the Study of Pain. The American Academy of Pain Medicine defines it as “An unpleasant sensation and emotional response to that sensation.” But for most everyone, pain is simply an unpleasant sensation that hurts. It is a subjective feeling that everyone learns through their own experiences. Each individual has their own tolerance for pain based on physical, emotional and psychological tendencies.

Pain can be **acute** - lasting only a short while - or **chronic**, lasting for a much longer duration. It can be divided into different types according to the mechanism involved (nociceptive and neuropathic pain), and further by the part of the body affected by it.

Nociceptive pain is caused by stimulation of peripheral nerve fibers (nociceptors), that respond only to stimuli approaching or exceeding harmful intensity. Different types of nociceptors are sensitive to different types of stimuli, the most common categories being “thermal” (heat or cold), “mechanical” (crushing, tearing, etc.) and “chemical” (ex. iodine in a cut, chili powder in the eyes). Nociceptive pain may also be divided into "visceral," "deep somatic" and "superficial somatic (cutaneous)" pain. **Visceral** pain originates in the organs and often is extremely difficult to locate. Nociception from some visceral regions may produce referred pain, where the sensation is located in an area distant from the site of the stimulus. **Deep somatic** pain is initiated by stimulation of nociceptors in ligaments, tendons, bones, blood vessels, fasciae and muscles, and can be an aching or sharp, localized pain. Examples include sprains and broken bones. **Superficial** pain is initiated by activation of nociceptors in the skin or other superficial tissue, and is sharp, well-defined and clearly located. Examples include minor wounds and burns.

Neuropathic pain is caused by damage or disease affecting any part of the nervous system involved in bodily feelings. Peripheral neuropathic pain is often described as “burning,” “tingling,” “electrical,” “stabbing,” or “pins and needles.” Bumping the “funny bone” or striking the radial nerve elicits peripheral neuropathic pain.

The ability to experience pain is essential for protection from injury, and recognition of the presence of injury. Episodic analgesia may occur under special circumstances, such as in the excitement of sport or battle, where no pain may be felt for several hours after a traumatic injury. Similar experiences can occur with certain narcotic use. Indifference to pain can also rarely be present from birth; these people have normal nerves on medical investigations, and find pain unpleasant, but do not avoid repetition of the pain stimulus.

Penetration Wound

Penetration wounds are caused by an object entering and coming out from the skin.

Posterior

Back; rear

Proximal

Located near to a point of reference such as an origin, a point of attachment, or the midline of the body.

Puncture Wound

Puncture wounds are caused by an object puncturing the skin, such as a nail or needle.

Sprains

Sprains are an injury to a ligament. Ligaments are tough, fiber-like tissues that hold bones together across a joint. Because ligaments have a limited blood supply, healing is usually prolonged. Ligament injuries usually include pain and swelling.

Ligament injuries are usually classified in three grades with Grade 3 being the most severe. Grade 1 sprains involve microscopic ligament tears with no change in length. Grade 2 sprains involve larger partial ligament tears with increased ligament length. Grade 3 sprains involve complete ligament rupture. These most severe sprains can cause permanent joint instability. Grade 3 sprains can have significant swelling but, surprisingly, may have less pain than a Grade 2 sprain due to the fact that the ligament is ruptured and under less stress.

Strains

Strains are muscle and tendon injuries. The most common cause of a strain is the forceful lengthening of a muscle or tendon when the muscle is contracted. This is called “eccentric elongation”. Muscle strains rarely cause joint instability and can be quite painful with inadvertent stretching.

Similar to sprains, strains are also graded by severity and extent of tissue damage. Grade 1 strains involve microscopic tears of fibers but no loss of strength. Grade 2 strains involve tears in tissue with significant swelling and pain that reduces strength. Grade 3 strains involve complete rupture of the muscle or tendon. This is a serious injury that requires medical care and possible surgical intervention.

Acute muscle and tendon injuries are usually associated with continuous pain. Muscle and tendon injuries caused by chronic overuse usually have pain that will go away during training only to return a few hours after training.

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