

THE INTERNAL TREATMENT OF TRAUMATIC INJURY

The focus of this paper is the treatment of traumatic injury with internally ingested Chinese herbal formulas. Whereas the strategy for external treatment of traumatic injury is governed by clinical manifestation, internal treatment strategies are governed by proper identification of progressive stages.

GENERAL SIGNS/SYMPTOMS OF ACUTE INJURY

There are three distinct stages of traumatic injury, which are expressed by a limited number of clinical manifestations. The three primary manifestations of the early stages of trauma are heat, swelling, and pain. Western medicine, since the time of the great Roman physician, Galen, has specified five signs, but the differences, from our point of view, is negligible. The five signs discussed by Western medicine are: pain, swelling, redness, heat, and loss of function. Oriental medicine combines heat and redness into one sign, since both a sensation of warmth and the visible sign of redness are classified as heat. The “loss of function” sign is seen by Oriental medicine as a mechanical consequence of significant qi and blood stasis, and cannot be addressed separately from qi and blood stasis by internal treatments. Thus, both East and West are in basic agreement about the signs of early stage injury. If acute injury develops into a chronic issue, other signs can come into play, such as numbness/tingling, localized weakness, and aggravation by external evils such as cold.

A WORD ABOUT BLEEDING

Bleeding is a special manifestation of traumatic injury, and is a pattern unto itself. In most injuries where there is bleeding, it must be stopped before further assessment is made.

THE STAGES OF TRAUMA

The **First Stage of Trauma** is the most distinct and is marked by the three chief manifestations of pain, heat, and swelling. Blood stasis and toxin are beginning to form. All traumatic injury involves the first stage of trauma, which can last anywhere from a few hours up to two weeks, depending on the type and severity of injury.

Heat usually manifests as localized redness, but in the absence of redness, heat might also be experienced by the patient as the sensation of heat at the site of the injury, or the area may be hot to the touch. In minor injuries, the heat may not be detectable, but it is always present. The treatment strategy is to clear heat and resolve toxin, dispel stasis, and relieve pain. The formulas used to treat stage one trauma are the coldest formulas of the three stages; they emphasize eliminating heat-toxin while helping the body move out damaged tissue.

The **Second Stage of Trauma** is in phase when the initial inflammation first subsides. What remains is blood stasis combined with congestion of qi and fluids in the local area. This congestion causes stiffness and pain. The damaged tissue weakens the defense against the invasion of external pathogens such as wind and damp. Swelling may remain a factor, especially if treatment during the first stage was neglected, insufficient, or if the damage was severe. The treatment strategy for the second stage of trauma is similar to the first stage, but clearing heat becomes secondary to moving blood and dispelling stasis. Herbs are added to dispel wind and damp so that these pathogenic factors do not become lodged in the area, leading to chronic *bi* syndrome.

The **Third Stage of Trauma** is traditionally marked by the need to rebuild tissue and dispel exogenous pathogens that may have transformed into wind-cold-damp *bi* syndrome. There is often residual blood stasis that contributes to the lingering pain. As a result, there is inevitable overlap between the second and third stage trauma formulas. Both should move blood, dispel stasis, and relieve pain, but in the second stage, heat may still be a minor factor, and the formulas are cooling or neutral. Third stage trauma formulas are the warmest of the formulas that treat trauma; they often contain kidney-supplementing herbs to stimulate the regeneration of ligaments, bones, and cartilage. Lingering heat in the injured area should be cleared before

employing a warm-property formula.

THE BODY'S RESPONSE TO TRAUMA:

A PATHOGENESIS

Biomedicine discusses traumatic injury as a subset of its understanding of inflammatory response in general. In other words, though inflammation can occur without injury, no injury is said to have occurred where the inflammatory response has not been engaged. The inflammatory response to injury is an extremely complex series of chemical interactions and histological changes. Over 180 chemicals have been identified as playing a role in acute inflammationⁱ. These chemical responses are collectively referred to as the "vascular reaction" to injury, owing to the fact that the targets of the chemical inflammatory mediators are the local vessels, and the vessels respond by creating the environment and supplying all the material for inflammation. The general picture of the vascular reaction to injury can be simplified as:

1. Tissue damage causes a release of chemical inflammatory mediators, such as histamines, prostaglandins, and kinens.
2. These chemicals cause:
 - (a) Vasodilation, and
 - (b) Increased adhesion properties to certain cells.ⁱⁱ

Vasodilation occurs as the result of two types of contraction. First of all, the smooth muscle around the larger vessels contract, which slows the flow of blood in the capillaries at the injured site to reduce blood loss. Then, the cells that line the inner wall (endothelial cells) in the smaller vessels contract. The contraction of the endothelial cells makes the vessel more permeable by increasing the space between cells that line the inner wall of the vessel. The vessel as a whole does not actually become larger in vasodilation; the only thing that gets larger is the space between the endothelial cells. The result is increased permeability. Vasodilation allows both red and white blood cells to leak out into the injured site. The presence of red blood cells outside the vessel is responsible for the color and heat associated with inflammation. The movement of plasma fluids out of the vessel and into the surrounding tissue creates localized swelling.

In addition to vasodilation, the chemical inflamma-

tory mediators cause the interior wall of the blood vessel to become sticky. Under normal circumstances, the leukocytes do not adhere to each other nor to the walls of the blood vessels; the endothelium is not sticky, and the leukocytes are too diffuse in the blood to collect in any one place. But the increased adhesion caused by the chemical release at the site of injury changes all that. Red blood cells do not adhere to the affected walls of the vessel, but leukocytes accumulate there. This accumulation, along with the localized thickening of the blood from the loss of plasma fluid, considerably slows down the flow of the blood through the vessels, contributing to what Oriental medicine calls "blood stasis." When the leukocytes become stuck and accumulate in the endothelium, the inside layer of leukocytes are able to migrate out of the vessel and into the injured tissue.

Two main leukocytes play a predominant role in the injured tissue: neutrophils and macrophages. If the skin has been breached, neutrophils can help destroy invading bacteria. The macrophages specialize in clearing out the area to make way for new cells by literally digesting bacteria and dead cells, but they are not formed inside the blood vessels. Monocytes are one of the predominant leukocytes that travel inside the blood vessels and accumulate on the endothelium. Monocytes are semi-differentiated white blood cells that further differentiate into macrophages when exposed to an inflamed environment. Whereas the primary chemical inflammatory mediators (histamines, prostaglandins, kinens, etc.) appear on the injury scene immediately, it typically takes monocytes 8-12 hours to accumulate in the endothelium and pass through into the injured tissue.ⁱⁱⁱ It can take an additional 8-72 hours before the monocytes differentiate into macrophages.^{iv} The period in which the macrophages^{iv} are in peak activity is determined mainly by the severity of the damage. In the cases of bone fracture or major surgery, the macrophages can be at peak activity for a few weeks. In mild to moderate trauma, such as a banged knee or elbow from a stumble, the macrophagic activity may only last from day two to day four. The period between the initial moment of injury and peak macrophagic activity is what constitutes the first stage of trauma in Oriental medicine.

Due to a short half-life of the chemical inflammatory mediators, the acute inflammatory response requires constant stimulation to be sustained. In addition, granulocytes (a special type of leukocyte) make their way into the injured tissue from the bloodstream in the same manner as the monocytes. These granulocytes act upon some of the mediators (the prostaglandins) to initiate a termination sequence. Inflammatory mediators are quickly degraded in the tissue. Hence, new inflammation ceases to generate once the stimulus has been removed.^v This is why temporary immobility can hasten the termination of the inflammation stage. Stress to an injured site from improper movement can re-stimulate the release of the chemical inflammatory mediators. The inflammation cessation program ends when the macrophages exit the site of injury by getting absorbed into the lymph system.^{vi}

TOXIN AND THE INFLAMMATORY RESPONSE IN ORIENTAL MEDICINE

Oriental medicine discusses inflammation differently. In Oriental medicine, not all toxin is heat type, but the vast majority of it is. The common quality of all toxin in Oriental medicine, hot or otherwise, is that its presence causes harm to the body. Usually, this harm connotes either (a) pathological tissue changes, or (b) violent qi rebellion. Poisons, for instance, if ingested, are not necessarily hot, but can cause rebellious qi in the form of severe vomiting, diarrhea, or headache. Heat-toxin causes pathological, though not necessarily permanent, tissue changes. When toxin enters the throat as an infection, there is swelling and pain. When it enters the body from a wound, there is purulence. In the case of traumatic injury, heat-toxin does not enter the body from the outside if the skin is not broken. Given that Oriental medicine does not accept the notion that the body attacks itself, why, then, do we consider the inflammatory response of traumatic injury to be “toxin”?

The Oriental medicine perspective is that heat-toxin causes the signs of inflammation, and inflammation is the result of heat-toxin accumulating and obstructing the normal flow of qi. Heat-toxin is created immediately following an external impact. The compression from the blow forces blood out of the vessel and forces the turbid *wei qi* to combine with the errant

blood. When warm, turbid qi combines with clear, nourishing blood, the warmth cooks the blood and the turbidity contaminates the clear. The product is toxin. It is “toxic” because the *wei qi* and blood are not in their proper places and do not have the right (*zhèng*) relationship to each other. *Zhèng* (right, righteous, correct) is in opposition to *xié* (evil, pathogenic).^{vii} Therefore, though the body is not attacking itself, the impact of the injury causes a localized *xié* relationship between qi and blood. This *xié* relationship results in tissue changes in the form of rubor (redness), swelling, and necrosis, hence: toxin.

SECONDARY INJURY PREVENTION

The main focus of first stage trauma treatment in both biomedicine and Oriental medicine can be summarized as an attempt to reduce or eliminate secondary injury so that healing can begin. Secondary injury is any further damage to the tissue peripheral to the locus of injury that occurs as a result of improper movement by the patient or aggravation from the inflammatory response itself. The former can be reduced through stabilization, but the latter must be addressed through topical application of cooling and invigorating herbs in conjunction with the appropriate internal (ingested) treatments. (See below.)

The pathophysiology of secondary injury is chiefly related to the swelling factor. Swelling creates pressure; pressure decreases blood flow to the injured area by compressing blood vessels^{viii} to the point where they can no longer transport enough oxygen to the injured area, so the healthy peripheral tissue begins to suffocate from lack of oxygen, thereby causing secondary necrosis. Swelling also restricts fluid flow between cells; more fluid will attempt to enter tissue surrounding the injury, causing these cells to burst and die. Chinese herbs are very effective at controlling secondary injury by invigorating blood flow, accelerating the removal of toxin, and promoting vessel repair.

THE SECOND STAGE OF TRAUMATIC INJURY

The second stage of trauma, according to Oriental medicine, begins when the inflammatory response begins to wane. There is an arc of inflammatory activity, with the vascular response on the one end, and the absorption of macrophages into the lymphatics on the other end. Somewhere in the middle there is a

point where there is more cessation of the inflammatory response than there is new inflammation stimulated. This transition can be easily observed by the clinician and patient. Once the heat signs have noticeably diminished, and swelling has stabilized or begun to subside, the second stage of trauma has begun.

BLOOD STASIS

Blood stasis is always present in traumatic injury. It begins to form in the first stage of traumatic injury, in which it is secondary factor after heat and swelling. Treatment during the first stage of trauma is concerned with hastening the elimination of heat-toxin, controlling swelling, and reducing the formation of blood stasis. By the second stage, the blood stasis preddominates. In second stage treatment, eliminating heat-toxin becomes secondary to dispersing stasis. The goal of dispersing stasis is to decrease pain and to clear the way for the tissue regeneration that characterizes stage three. Blood stasis is the result of:

1. Primary vessel damage,
2. Extravasation,
3. Pressure from swelling, and
4. Increased adhesion.

Primary vessel damage occurs at the moment of impact. Some extravasation occurs at impact, but also comes from the vascular reaction to injury. That is, the increased permeability of the vascular reaction allows for blood—both red and white cells—to leak out of the vessel into the surrounding tissue. Pressure from swelling decreases blood flow to the injured area by compressing blood vessels. Above, it was described how chemical stimulators cause increased adhesion properties as part of the vascular reaction to injury. In Oriental medicine, we say that blood that has been cooked by *wei qi* becomes sticky. The resulting toxin, therefore, has a tendency to accumulate, and this accumulation complicates the blood stasis situation both by increasing pressure via swelling, and by restricting flow within the vessels themselves.

EXTERNAL PATHOGENS

Damaged and weakened tissue is always highly susceptible to invasion from external evils. Once the heat-toxin is mostly eliminated, treatment strategies should include some action to dispel wind, cold and damp, as well as protect the area from further pen-

etration by these pathogens. In second stage treatment, expelling external pathogens is secondary to eliminating stasis, but must be addressed.

The third stage of trauma, according to the biomedical model, is about tissue healing. This is also the case in Oriental medicine, but we are additionally concerned with the expulsion of and protection from invading pathogens like wind, cold, and damp.

All of the body's responses to injury are part of its healing process. The vascular reaction initiates the inflammatory response. In Oriental medicine, we tend to think of inflammation as pathogenic, even calling the substance of inflammation *dú*, "toxin." But all of these are part of healing. Biomedicine describes the functions of inflammation to be:

1. To fight off possible infectious agents,
2. To remove debris, such as broken cells, and
3. To prepare the area for reconstruction.^{ix}

These functions are neatly arranged to suggest that inflammation initiates all three stages of trauma. Fighting off possible infection is most closely associated with the heat signs of the first stage of trauma. Once debris has cleared significantly, swelling and heat begin to decline and the patient is in the second stage of trauma. The third function of inflammation is to prepare for the healing and regeneration characteristic of the third stage of trauma. But inflammation can easily spin out of control, and Chinese medicine attempts to regulate the process.

THE THIRD STAGE OF TRAUMATIC INJURY: TISSUE HEALING

Tissue healing begins as the inflammatory process starts to slow down, but the two processes overlap. Macrophages clear out debris and prepare the area for the regeneration of new tissue. After a few days, fibroblasts (collagen-producing cells) begin to construct a new collagen matrix, upon which new cells will generate. Once inflammation is sufficiently restrained and there is enough space, new capillaries begin to sprout, bringing fresh blood to the region. This is known as angiogenesis or revascularization. When blood flow has been reestablished, specific tissue cells begin to generate around the collagen matrices (such as muscle tissue or bone tissue). If the injury is severe

enough to involve several types of tissue, there may also be “non-specific” cells. If these are not removed, they can evolve into scar tissue. Chinese herbs can help reduce the formation of scar tissue by use of blood nourishing and invigorating substances, such as angelica root (*dang gui*) and spatholobus (*ji xue teng*).

New blood bathes the nascent cells; as they mature, they begin to proliferate. The proliferation phase lasts up to four weeks. After there are enough new cells, the remodeling stage takes over. The new cells knit together to produce functioning tissue. Depending on the severity of the initial damage, remodeling can take from a few weeks to a few years.^x During remodeling, the new tissue orients according to the stresses imposed upon it. It is therefore important to gently stretch in the correct direction so as to optimize the strength of the new tissue.

A NOTE ABOUT RICE

Since the best-selling *Sportsmedicine* book by Gabe Mirkin, MD was published in 1978, the paradigmatic protocol for treating trauma consisted of the 4 elements: Rest, Ice, Compression, and Elevation, or, RICE. Traditional Chinese medicine has generally shunned the use of ice for anything, viewing cold as one of the fundamental pathogens. In the classical view, if cold is applied to an injury site, the cold will push the pathogen down into the bone or deep into the joint, where it will lie latent, arising later as arthritis or some other bi syndrome issue. Recent research has demonstrated conclusively that, although cooling (icing) can delay swelling, it does not hasten recovery.ⁱ It is to his credit as a clinician and researcher that Dr. Mirkin himself has come to accept this conclusion, and in his March 16, 2014 blog he recanted his recommendation of using ice to treat trauma and explained why the inflammatory response is necessary and exactly how ice delays recovery.ⁱⁱ

ⁱ The American Journal of Sports Medicine, June 2013

ⁱⁱ <http://drmirkin.com/fitness/why-ice-delays-recovery.html>

SUMMARY OF THE THREE STAGES OF TRAUMA

Stage of Trauma	Pathophysiology	Major Signs	Focus of Treatment
First Stage	Vascular Reaction Inflammatory Response Heat Toxin Formation Formation of Blood Stasis	Heat/Rubor Swelling Pain	1. Eliminate Heat-Toxin 2. Move Blood, Limit Stasis Formation 3. Stop Pain
Second Stage	Blood Stasis Predominates External Pathogens Invade Lingering Heat Toxin Removal of Debris	Pain Stiffness and Swelling Slight Heat	1. Move Blood, Break Up Stasis and Stop Pain 2. Expel External Pathogens 3. Finish Eliminating Toxin
Third Stage	Collagenation Angiogenesis Proliferation Remodeling	Vacuity Pain Weakness Chronic Pain Persistent Pain	1. Knit New Tissue 2. Expel External Pathogens 3. Stop Pain

FIVE FORMULAS FOR THE INTERNAL TREATMENT OF TRAUMATIC INJURY (SUMMARY)

Trauma 1 Formula (*Die Da 1 Hao Fang*)

This formula is for first stage trauma when the manifestations of heat, pain, and swelling are all present. It can be used to treat injury to muscles, tendons, bone, ligaments, or cartilage and can be used to treat sprains, strains, contusions, broken bones, and fractures. It strongly moves blood, clears heat, and reduces the swelling and pain occurring at the onset of traumatic injury.

Tieh Ta Formula (*Die Da Wan*)

This is a general application trauma formula based on traditional formulas used to treat martial arts injuries. Tieh Ta Formula strongly reduces pain; it moves and builds blood, regenerates tissue, and reduces swelling.

It is excellent when pain is the main symptom and heat is not a major factor in an injury, and is therefore perfect for early second stage trauma, but is applicable in any phase of first or second stage injury. Tieh Ta Formula can address minor bleeding problems sustained from injury, help reduce bruising, and prevent scarring.

Trauma 2 Formula (*Die Da 2 Hao Fang*)

For second stage trauma, this formula is best applied shortly after the initial inflammation and swelling have significantly receded. This formula can be used to treat pain, stiffness, and swelling in an injury where the heat and rubor have subsided. In addition to clearing away the remaining stasis and relieving pain and swelling, Trauma 2 Formula dispels wind and damp, clears residual heat, and assists the body in the reconstruction of tissue. It can be used to treat bruises, sprains, strains, jammed fingers or toes, torn ligaments, or cartilage.

Bone & Sinew Formula (*Zheng Gu Xu Jin Fang*)

This formula is used in late second stage and throughout the third stage of trauma. Proper application of this formula assumes that the heat and rubor have cleared completely and that there remains an invasion of wind and damp (and possibly cold) in the injured area, causing the pain to linger. Bone & Sinew Formula can be used to mend sinews and help to properly set bones. Use it for second and third stage torn ligaments, tendons, damaged cartilage, or broken bones.

San Qi Formula (*San Qi Pian*)

Can be employed when acute bleeding is the main issue, whether it is internal or external bleeding.

Endnotes

ⁱMerrick, Mark A., *Inflammation and Secondary Tissue Damage*, Penn State University Athletic Training Conference, State College, PA, March 2003.

ⁱⁱFrontera, Walter R., ed., *Rehabilitation of Sports Injuries—Scientific Basis*, Blackwell Science Ltd, 2003.

ⁱⁱⁱSteube, K.G., Teepe, D., Meyer, C., Zaborski, M., Drexler, H.G. "A Model System in Haematology and Immunology: The Human Monocytic Cell Line MONO-MAC-1," *Leukemia Research*, 21(4): 327-335, 1997.

^{iv}Jansa, P., Kratky, J., "Enzyme Pattern of Macrophages in the Course of Inflammation," *Annals of Hematology*, May 16, 2005.

^vCotran, R., Kumar, V., Collins, T, and Robbins, S. *Robbins*

Pathologic Basis of Disease. Philadelphia: W.B Saunders Company, 1998.

^{vi}Serhan CN, Savill J (2005). "Resolution of Inflammation: The Beginning Programs the End," *Nature Immunology*, 6 (12): 1191-7.

^{vii}Wiseman, N., Ye, Feng, *A Practical Dictionary of Chinese Medicine*, Paradigm Publications, 1998.

^{viii}Houglum, PA, "Soft Tissue Healing and Its Impact on Rehabilitation," *Journal of Sport Rehabilitation*, 1 (1): 19-39, 1992.

^{ix}Evans, P. "The Healing Process," *Physiotherapy* 66: 8 256-259, 1980.

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TRAUMA 1 FORMULA *DIE DA 1 HAO FANG*

ORIGINS: A modern formulation based on traditional principles.

Trauma 1 Formula (*Die Da 1 Hao Fang*) is a modern formulation for the treatment of the first stage of traumatic injury.

GENERAL SIGNS/SYMPTOMS

This formula is for first stage trauma when the manifestations of heat, pain, and swelling are all present. It can be used to treat injury to muscles, tendons, bone, ligaments, or cartilage and can be used to treat sprains, strains, contusions, broken bones, and fractures. It strongly moves blood, clears heat, and reduces the swelling and pain occurring at the onset of traumatic injury. This stage can last from a few hours to a few weeks, depending on the type and severity of injury.

ACTIONS

1. Clears heat to reduce swelling and inflammation

2. Resolves toxin

3. Invigorates blood to dispel stasis and relieve pain

INGREDIENTS

PINYIN	PHARMACEUTICAL	ENGLISH	PERCENT OF FORMULA
Tao Ren	Persicae (semen)	Peach kernel, Persica seed	12%
Lian Qiao	Forsythiae (fructus)	Forsythia fruit	12%
Jin Yin Hua	Lonicerae (flos)	Japanese Honeysuckle flower	12%
Hong Hua	Carthami (flos)	Safflower, Carthamus flower	10%
Ru Xiang	Olibanum	Frankincense	9%
Mo Yao	Myrrha	Myrrh	9%
Huang Qin	Scutellariae (radix)	Chinese Skullcap root, Scutellaria, Scute	8%
Dang Gui	Angelicae sinensis (radix)	Purple Angelica root	8%
Chai Hu	Bupleuri (radix)	Bupleurum root	8%
Da Huang	Rhei (radix et rhizoma)	Chinese Rhubarb root and rhizome	5%
Bai Zhi	Angelicae dahuricae (radix)	Angelica root	4%
Gan Cao	Glycyrrhizae (radix)	Chinese Licorice root	3%

GENERAL INDICATIONS

- Traumatic injury in the first stage with heat, swelling and pain
- Muscular strain
- Bruises
- Sprains
- Cartilage damage
- Torn ligaments or tendons
- Fractures or broken bones
- Jammed toes or fingers
- Promote post-surgical healing
- Cuts, lacerations (after bleeding has stopped)

SYNERGY OF INGREDIENTS

Persica (*tao ren*) and safflower (*hong hua*) are two herbs that are commonly combined to enter and invigorate the blood in the channels and collaterals. When combined with rhubarb (*da huang*), this becomes a powerful combination for use with traumatic injuries. *Da huang* adds the ability to eliminate blood stasis and accumulated heat of inflammation through purgation.

Forsythia (*lian qiao*) and honeysuckle (*jin yin hua*) decrease the inflammation from traumatic injury by clearing heat and eliminating toxin. Frankincense (*ru xiang*) and myrrh (*mo yao*) are a strong blood moving combination with analgesic effects. The additional advantage of *ru xiang* is its ability to relax tendons, thus it is commonly used to relieve musculo-skeletal pain. *Mo yao* disperses blood and eliminate blood stasis. Both *mo yao* and *ru xiang* generate flesh and promote healing from flesh wounds.

FORMULA ACTIONS

- Clears heat to reduce swelling and inflammation
- Resolves toxin
- Invigorates blood to dispel stasis
- Relieves pain

TONGUE

The tongue may not show the effects of the qi and blood stagnation immediately after the trauma.

The body color could be normal, pale red or reddish purple with distended veins under the tongue indicating qi and blood stagnation.

PULSE

Choppy, tight, or wiry.

CONTRAINDICATIONS / CAUTIONS

Contraindicated during pregnancy.

Not for use while nursing. The cooling, bitter properties of these herbs may irritate the infant's digestion, and make the milk taste bitter.

Contraindicated in cases of people who bruise easily, as in vitamin K deficiencies, or those taking blood thinners, such as Warfarin or Heparin.

DOSAGE

The minimum effective dosage for adults begins at 2 tablets, 3 times a day. Practitioner discretion may prescribe as many as 5 tablets, 3 times a day in cases of severe inflammation in patients with strong digestion. Decrease dosage if abdominal pain develops or if stools become overly loose.

Skullcap (*huang qin*) is a cold herb and adds anti-inflammatory action to the formula. It also has strong antibiotic properties to protect the injured site from infection.

Although Chinese angelica (*dang gui*) is known for its ability to tonify blood, here it is used for invigorating blood to prevent blood stasis and reduce swelling. *Dang gui* is found in a number of classical formulas used to treat traumatic injuries and often used in the treatment of trauma in Chinese hospitals in order to help reduce the formation of scar tissue.

Bupleurm (*chai hu*) and skullcap (*huang qin*) are often used together to simultaneously expel a pathogen from the exterior and clear heat from the interior. *Chai hu* has a dispersing action, and *huang qin* a downward draining and cooling action. *Chai hu* also has the ability to relieve tension experienced throughout the body in the post trauma stages. This tension inhibits the flow of qi. *Chai hu* disperses liver qi stagnation in order to free up the tendons, sinews, and blood flow.

Rhubarb (*da huang*) is added to this formula for its ability to invigorate blood and remove blood stasis, especially when combined with *hong hua*, *tao ren*, and *dang gui*. Individuals who are sensitive and have a tendency to loose stools may experience an increase in frequency of bowel movements while taking this formula. In the classic formula, *Fu Yuan Zhu Yu Tang*, *da huang* and *chai hu* are the chief ingredients and work together to relieve pain. *Chai hu* acts to soothe liver qi stagnation and guide the blood invigorating abilities of *da huang* to the hypochondriac area to relieve pain.

Angelica (*bai zhi*) is added to this formula as a guiding herb to the upper parts of the body and to the *yangming* channel. This also balances the effects of *da huang's* action to direct downward.

Licorice (*gan cao*) harmonizes all the herbs in the formula and guides to all twelve meridians. It also has an anti-inflammatory action.

FORMULA APPLICATIONS**Trauma to Soft Tissue**

♦ Sprains & Strains

The joints are the “dwelling of the sinews”, meaning that the sinews are gathered *around* the joints. Chinese medicine uses the term sinews (*jin*) to reference the structures surrounding a joint. These include the fascia, tendons, ligaments, subcutaneous tissue, and muscle. “Sinews” are distinct from “sinew channels”. The former describes physical structures while the latter denotes energetic pathways. One important distinction is that the “sinew channels” do not enter the joints, yet joints are included among sinew structures.

A sprain occurs to a ligament when a joint is forced past its physiological range of motion—the limits of movement imposed by the ligament's rather rigid structure. When this occurs, small hemorrhages and tears in the fibers of the ligament can occur. Strains, on the other hand, occur when there is trauma to a muscle or the muscle-tendon unit, whether from violent contraction or excessive forcible stretch.

Ligaments function to preserve the structure of a joint. If a limb moves beyond its physiological range of motion, it will pull on the ligaments. Pain that is aggravated by passive range of motion (e.g., the patient's limb is moved by the physician) suggests a ligamentous sprain or bone injury. If the pain is worse with active range of motion (e.g., the patient moves the limb without assistance), then it is likely to be a strain to the tendons. Of course, in many cases, and particularly in the initial stage of injury, there is pain with any kind of movement, passive or active, yet these tests can still be used. For instance, one can differentiate a ligament sprain by checking for increase of pain occurring especially at the end of passive range of motion.

Trauma 1 Formula is best used for the initial stage of Grade 1 or 2 injuries. Grade 1 describes a mild sprain with microscopic tearing. There is typically mild pain, little or no visible bruising, some local swelling, and range of motion is still good, even if the area hurts a bit during motion. Grade 2 consists of a moderate sprain with incomplete or partial rupture of the ligament or tendon. There is significant pain and visible bruising, even 24-72 hours after the injury. Range of motion is decreased considerably.

The herbs in **Trauma 1 Formula** function to facilitate the movement of blood and qi so that normal circulation is restored, waste products can be removed, and nutrients can once again freely enter the traumatized area.

Trauma to Bones

✦ First Stage

The initial stage of bone injury (up to about 1-2 weeks after the injury) involves local qi and blood stagnation, with inflammation—swelling, redness, heat, and pain. **Trauma 1 Formula** should not be used when there is still visible bleeding, particularly

in the case of a bone fracture or open wound. After stabilization and medical treatment to set the bones, **Trauma 1 Formula** can be used to assist with the still acute stage of bone injury. **Tieh Ta Formula** is also excellent, particularly when there is more serious bone bruising and pain.

✦ Second Stage

There are many products to help with intermediate stage of bone healing (3-6 weeks after an injury, or even as long as 8 weeks), when there is increased stiffness, aches and pains, or when the injury is slow to heal. The treatment at this stage is to move the blood, and unblock and relax the channels. Formulas for this include **Course & Quicken Formula**, **Trauma 2 Formula**, and a variety of topical herbal plasters and soaks.

✦ Third Stage

Later stages (usually more than 6 weeks after a bone injury) require tonification of qi and blood and/or the liver and kidney as well as actions to dispel wind, cold, and damp. These can help the process of healing and prevent *bi* syndromes, leading to arthritis or other joint conditions. **Bone & Sinew Formula**, **Ginseng & Longan Formula**, **General Tonic Formula**, and **True Yin Formula** are all useful at this stage.

Post Surgical Trauma

Surgery is considered a form of trauma. If the patient has experienced a minor surgery with local anesthesia and is not taking blood thinners, **Trauma 1 Formula** would be appropriate. This formula may or may not be appropriate if the patient received general anesthesia prior to surgery and is experiencing gastric distress as a result, as it may make the gastric distress worse. This formula may potentiate the effects of pain relieving medications. It should, therefore, be used with caution in such cases.

FORMULA COMBINATIONS

According to Bisio, trauma formulas like this one are usually combined with external therapies, like *tui na*, bleeding, cupping, and topical herbal treatments in order to treat the problem from the inside and outside simultaneously.ⁱⁱⁱ

Trauma 1 Formula and San Qi Formula

If the injury involves internal or external bleeding, **San Qi Formula** may be appropriate, and can be

combined with **Trauma 1 Formula** to increase the formula's ability to stop bleeding.

Spring Wind Soft Plasters with Trauma 1 Formula

In the initial stage of trauma, when there is more redness, inflammation, and swelling, **Trauma 1 Formula** may be taken internally and Spring Wind Soft Plaster #1, #2, #3, or #4 could be applied externally. **Soft Plaster #1** is the general all purpose plaster for first stage trauma when redness, swelling, and inflammation are the primary symptoms. **Soft Plaster #2** is used when swelling is the primary symptom during first stage of trauma. **Soft Plaster #3** is used when pain is the most prominent symptom in the first stage of trauma. Predominating pain may call for a switch to **Tieh Ta Formula** to be taken internally. If there is an excess amount of heat, any of these plasters may be combined with **Soft Plaster #4** to increase the heat clearing ability of the other plasters. For specific instructions on how to use Spring Wind Soft Plasters, see the Herbal Medicine Press handout entitled, "*The External Treatment of Trauma.*"

Endnotes

ⁱJennes, Fred, Flaws, Bob, *Herb Toxicities and Drug Interactions, A Formula Approach*, Boulder, CO: Blue Poppy Press, 2004, p. 71.

ⁱⁱ Ellis, Andrew, *Notes from South Mountain*, Berkley, CA: Thin Moon Publishing, 2003, p. 387.

ⁱⁱⁱ Bisio, Tom, *A Tooth from the Tiger's Mouth*, New York: Simon & Schuster, 2004, p. 12.

TIEH TA FORMULA *DIE DA WAN*

ORIGINS: A modern formulation based on traditional principles.

Tieh Ta Formula (*Die Da Wang*) is based on modern formulations used to treat martial arts injuries. There are components from the namesake formula, *Die Da Wan* and from *Qi Li San*. *Qi Li San*, Seven Thousandths of a Tael Powder, was published in the *Collection for the Common Pursuit of Longevity*, originating in 1762. It was formulated for external application and later used internally. *Die Da Wan* is attributed to a much more recent origin, published in the *Nationwide Collection of TCM Patent Formulas* in 1962.

GENERAL SIGNS/SYMPTOMS

Pain, swelling, and bruising that result from traumatic injury. Most effectively used in early second stage trauma, or in the first stage when there is little or no heat.

ACTIONS

1. Moves blood and transforms blood stasis

2. Reduces swelling

3. Alleviates pain

INGREDIENTS

PINYIN	PHARMACEUTICAL	ENGLISH	PERCENT OF FORMULA
San Qi, Tian Qi	Notoginseng (radix)	Tienqi Ginseng, Psuedoginseng root	14.35%
Dang Gui	Angelicae sinensis (radix)	Chinese Angelica root, Tang Kuei	14.35%
Yu Jin	Curcumae (radix)	Tumeric, Curcuma tuber	9.5%
Bai Dou Kou	Amomi rotundus (fructus)	Chinese Amomum	9.5%
Da Huang	Rhei (radix et rhizoma)	Chinese Rhubarb root and rhizome	9.5%
Hong Hua	Carthami (flos)	Safflower, Carthamus flower	7.1%
Huai Niu Xi	Achyranthis bidentatae (radix)	Achyranthes root	7.1%
Xu Duan	Dipsaci(radix)	Japanese Teasel root, Dipsacus	7.1%
Gu Sui Bu	Drynariae (rhizoma)	Drynaria rhizome	7.1%
Xiang Fu	Cyperi (rhizoma)	Cyperus, Nut-Grass rhizome	4.8%
Ru Xiang	Olibanum	Frankincense	4.8%
Mo Yao	Myrrha	Myrrh	4.8%

GENERAL INDICATIONS

- Bruises
- Fractures and broken bones
- Joint dislocations
- Torn or sprained ligaments
- Muscle strains
- Pain and distension from injury
- Post-operative pain and swelling
- Sports injury
- Traumatic injury
- Post-Traumatic Stress Disorder

SYNERGY OF INGREDIENTS

Notoginseng root (*san qi*), is the chief ingredient in this formula. Many of the modern *Die Da* formulations use daemonoropis resina (*xue jie*) instead of *san qi*. *San qi* is not only stronger to stop bleeding, an action it shares with *xue jie*, but it also is strong in its actions to invigorate blood and relieve pain. It can be helpful with internal bleeding and hematomas, as well as external bleeding.

Although Chinese angelica root (*dang gui*) is known for its ability to tonify blood, when used in a formula to treat traumatic injury, its inclusion is for the purpose of invigorating blood to prevent blood stasis, reduce swelling, and limit the formation of scar tissue. *Dang gui* is found in a number of classic formulas used to treat traumatic injuries and is often used in treatment of trauma in Chinese hospitals.

FORMULA ACTIONS

- Moves blood and transforms blood stasis
- Reduces swelling
- Alleviates pain

TONGUE

There may be no significant tongue diagnostic indications if the trauma is recent.

PULSE

Choppy, tight, or wiry.

CONTRAINDICATIONS / CAUTIONS

Contraindicated during pregnancy or while nursing.

Contraindicated in cases of people who bruise easily, as in vitamin K deficiencies, or those taking blood thinners, such as Warfarin or Heparin.

DOSAGE

The minimum effective dosage for adults begins at 2 tablets, 3 times a day. Practitioner discretion may prescribe as many as 5 tablets, 3 times a day in cases of significant trauma, such as post-surgical trauma, in patients with strong digestion. Decrease dosage if abdominal pain develops or if stools become overly loose.

Curcuma (*yu jin*) not only has the ability to activate the movement of blood and qi, but also cools blood and clears excess heat. In this way it can reduce inflammation and swelling in a recent traumatic injury. This herb is contraindicated for use with patients who do not have qi and blood stagnation and those with yin deficiency, due to its bitter, cold nature. The use of *yu jin* could further damage yin, especially if there is little or no dampness present.

Amomum (*bai dou kou*) has been added to this formula to warm and move middle *jiao* qi, and to dry dampness. This addition may counterbalance the effects of the colder herbs on the middle *jiao*.

Rhubarb (*da huang*) enters the blood level to purge heat-toxin downward and disperses blood stasis. It is helpful when there are bruises, swellings, and masses associated with traumatic injury. *Da huang* represents almost 10% of this formula, it could produce loose stools in patients with weak digestion. Although this tendency is counterbalanced by the addition of amomum (*bai dou kou*) to the formula in equal amount, it is advisable to monitor and regulate dosage in such cases.

Safflower (*hong hua*) invigorates the circulation of blood in the channels and collaterals and moves blood stasis. These actions contribute to the formula's ability to transform blood stasis, specifically in the more superficial layers of the body.

Achyranthes (*huai niu xi*) is often used to relieve musculoskeletal pain. It goes directly to the tendons and bones to activate blood and qi circulation. It also has a strong descending action and has the added advantage of directing the actions of the formula downward. When combined with safflower (*hong hua*), frankincense (*ru xiang*) and myrrh (*mo yao*), as it is in this formula, it is an excellent remedy for musculoskeletal pain from external injuries.

Dipsacus (*xu duan*) has a strong action to dredge the channels and collaterals to reduce swelling and pain. Since it enters the kidney and liver channels it also strengthens bone and sinews and invigorates blood circulation. *Xu duan* is one of the most commonly used herbs in trauma departments of Chinese hospitals. *Gu sui bu* means "mender of shattered bones". This herb (*drynaria*) goes directly to the kidney and liver and tonifies the kidney, while dispelling blood stasis. Modern research has shown that *gu sui bu* increases bone absorption of calcium. *Gu sui bu* and *xu duan* are often combined for their synergistic effects to tonify the liver and kidney and heal bone and tendon.

Cyperus (*xiang fu*) is included in this formula primarily to ease liver qi stagnation. When liver qi flows more smoothly, both qi and blood flow more smoothly and thus pain is relieved. *Xiang fu* guides to the rib area and the liver channel, and is helpful if the

injury includes broken or bruised ribs. Some ancient texts indicate that this herb enters all twelve channels, and relieves stagnation of all six factors; blood, qi, phlegm, food, fire, and damp.

Frankincense (*ru xiang*) and myrrh (*mo yao*) relieve pain by moving blood and qi stagnation; they also generate flesh to heal wounds. *Ru xiang* is stronger to invigorate blood and relax tendons to relieve musculoskeletal pain. *Mo yao* is stronger to move qi and blood, thus dispersing blood stasis to relieve pain.

FORMULA DISCUSSION

“*Tieh Ta*” means “fall and strike.” This term refers to a group of formulas developed in Chinese medicine to treat traumatic injury. The formulations vary primarily in whether they clear heat or are warming. All of these formulas move blood and qi to relieve the pain of traumatic injury.

The primary treatment principle of **Tieh Ta Formula** is: move blood and transform blood stasis to relieve pain and promote healing. Ten of the twelve herbs in this formula have some ability to transform blood stasis. The two chief herbs enable the formula to also focus on treating the results of internal bleeding, bruising, and swelling, thus relieving stagnation and allowing the body to direct its energies to healing the trauma.

Looking at the treatment principle from the perspective of the whole organism it is helpful to remember this ancient Chinese medical axiom, “*Tong ze bu tong, bu tong ze tong*”—“When there is flow, there is no pain and when there is pain there is no flow.” The main focus of **Tieh Ta Formula** serves this principle in the first and early second stage of injury.

The formula has little ability to clear heat since only 19% of the formula is made up of cold herbs, and this is counterbalanced by the warming herbs. Inflammation would be better treated with **Trauma 1 Formula** combined with a topical application.

FORMULA APPLICATIONS

Traumatic Injury

Die Da Wan was developed by martial artists to treat traumatic injury. This version of **Tieh Ta Formula** is one of dozens of variations on this formula. This is the internal counterpart to *Die Da Gao* or

many other liniments that can be used to treat injuries externally such as *Zheng Gu Shui*, Dr. Shir’s Liniment, or Spring Wind’s Soft Plasters, to name a few. These options will be covered more specifically in the Formula Combinations section below.

Icing has been a standard part of treatment for traumatic injury for a long time, but cold contracts muscles, sinews, tendons, and can induce re-injury by creating less flexibility. If icing is continued beyond the initial stage of injury, it can leave the injured area prone to re-injury, cold-wind-damp invasion, chronic pain, and atrophy from improper and incomplete healing. An alternative from Oriental medicine is a simple herbal formula called *San Huang San*, also called “herbal ice”. For external application as a poultice applied to the site of traumatic injury combine equal amounts of each of the bulk herbs or granules: rhubarb (*da huang*), scutellaria (*huang qin*), phellodendron bark (*huang bai*), (the three yellows), dandelion (*pu gong ying*), gardenia fruit (*zhi zi*), and safflower (*hong hua*). Grind these herbs and mix the resulting powder into a medium such as Vaseline, green tea, or egg whites. Apply to the area as a soft plaster then cover with gauze. Compression, elevation, and rest can certainly be beneficial in this initial stage of trauma.

These suggestions can be combined by taking **Trauma 1 Formula** or **Tieh Ta Formula** internally to accentuate the effect to clear heat, reduce inflammation and pain in the first 24-48 hours after an injury. There are a number of other Oriental medicine methods that may be included in the initial traumatic injury protocol, such as cupping, local bleeding, acupuncture, liniments, soft plasters, and *tuina*.

Once the redness, swelling, inflammation, and local sensation of heat has dissipated, **Trauma 2 Formula** may be started. Warmth, applied occasionally, and gentle movement, depending on the injury, will help to move qi and blood into the area.

Post-Traumatic Stress Disorder

Traumatic injury sometimes results in emotional injury as well. **Tieh Ta Formula** can also be used to move the emotional “stasis” that results from traumatic injury in much the same way that the classic formula, *Xue Fu Zhu Yu Tang*, has been used

for the same purpose.

Formulas used for resolving emotional issues are often given in “spirit dosages”. Consider using one-half or one-third the suggested standard dosage of 2 tablets, 3 times daily for treating post-traumatic stress disorder originating from physical injury.

FORMULA COMBINATIONS

Tieh Ta Formula combined with the appropriate external applications is an effective strategy to treat traumatic injury in its first and second stage. In mild to moderate injury, if the appropriate treatment is given in these first two stages, it is highly unlikely that the injury will develop into a chronic issue.

Tieh Ta Formula with Spring Wind Soft

Plaster #1

Use this combination of internal and external herbal medicine for the first stage of sinew damage when heat, swelling, and redness are present.

Tieh Ta Formula with Spring Wind Soft

Plaster #2

Use this combination of internal and external herbal medicine for the first stage of traumatic injury when the treatment principle is to more strongly move blood to relieve pain, as well as clear heat and inflammation.

Tieh Ta Formula with Spring Wind Soft

Plaster #3

Use this combination of internal and external herbal medicine for the first stage of traumatic injury when the primary focus of treatment is to reduce swelling, and secondarily to relieve pain and clear heat.

The use of Dr. Shir’s Liniment externally can be combined with **Tieh Ta Formula** taken internally. Dr. Shir’s can be massaged gently and superficially into the area of injury. This will open the pores to increase the absorption of the herbal medicine into the tissues. It is then advisable to cover the area in order to protect it from external pathogenic invasion. Cover with something that is breathable such as gauze, not plastic. This liniment can be applied in combination with the appropriate soft plaster.

Spring Wind Amber Massage Salve can be used topically while using **Tieh Ta Formula** internally.

Amber Massage Salve acts on first or second stage of traumatic injury to move blood and clear heat, to reduce pain by invigorating blood and qi locally.

TRAUMA 2 FORMULA *DIE DA 2 HAO FANG*

ORIGINS: *A modern formulation based on traditional principles.*

Trauma 2 Formula (*Die Da 2 Hao Fang*) is a modern formulation for the treatment of the second stage of traumatic injury.

GENERAL SIGNS/SYMPTOMS

This formula is useful in treating the second stage of trauma when the initial inflammation is noticeably subsiding. The chief symptom that remains is pain from blood stagnation, combined with qi and fluid congestion in the local area. This congestion causes stiffness and can amplify the pain. The treatment strategy for the second stage of trauma is similar to the first stage, but clearing residual heat is secondary to moving blood and dispelling stasis. Herbs are added to dispel wind and damp so that these pathogenic factors do not become lodged in the area, becoming chronic *bi* syndrome.

ACTIONS

1. Moves blood and dispels blood stasis , relieves pain

2. Disperses wind and dampness

3. Clears heat

INGREDIENTS

PINYIN	PHARMACEUTICAL	ENGLISH	PERCENT OF FORMULA
Dang Gui	Angelicae sinensis (radix)	Chinese Angelica root, Tang Kuei	9%
Ru Xiang	Olibanum	Frankincense	9%
Mo Yao	Myrrha	Myrrh	9%
Chuan Niu Xi	Cyathulae (radix)	Cyathula root	9%
Fang Feng	Saposhnikoviae (radix)	Siler root	9%
Ji Xue Teng	Spatholobi (caulis)	Spatholobus stem	9%
Chi Shao	Paeoniae rubrae (radix)	Red peony root	9%
Fu Ling	Poria	Poria, Tuckahoe	8%
Hong Hua	Carthami (flos)	Safflower	7%
Su Mu	Sappan (lignum)	Sappan wood	6%
San Qi / Tian Qi	Notoginseng (radix)	Pseudoginseng, notoginseng root	5%
Bai Zhi	Angelica dahurica (radix)	Angelica root	4%
Da Huang	Rhei (radix et rhizoma)	Rhubarb root and rhizome	4%
Gan Cao	Glycyrrhizae (radix)	Licorice root	3%

GENERAL INDICATIONS

- Traumatic injury in the second stage marked by stiffness and/or pain
- Muscular strain
- Bruises
- Sprains
- Cartilage damage
- Torn ligaments or tendons
- Fractured or broken bones
- Jammed toes or fingers
- Promotes post surgical healing

SYNERGY OF INGREDIENTS

Chinese angelica root (*dang gui*) is the chief ingredient in this formula. It invigorates the blood to prevent blood stasis and reduce pain. (See page 8 for more details.)

Frankincense (*ru xiang*) and myrrh (*mo yao*) are a strong blood moving combination with analgesic effects. The additional advantage of *ru xiang* in treating traumatic injury is its ability to relax tendons, thus, it is commonly used to relieve musculoskeletal pain. *Mo yao* is stronger to disperse blood and eliminate blood stasis. Both *ru xiang* and *mo yao* generate flesh and promote healing from flesh wounds.

FORMULA ACTIONS

- Move blood, dispels stasis, relieves pain
- Dispels wind and damp
- Clears heat

TONGUE

The tongue may not show the effects of the qi and blood stagnation immediately after the trauma but by the second stage of trauma this can change. The tongue body color may be reddish purple or purple and may have distended sublingual veins, indicating qi and blood stagnation.

PULSE

Choppy, tight or wiry.

CONTRAINDICATIONS / CAUTIONS

Contraindicated during pregnancy.

Not for use while nursing. The cooling, bitter properties of these herbs may irritate the infant's digestion, and make the milk taste bitter.

Contraindicated in cases of people who bruise easily, as in vitamin K deficiencies, or those taking blood thinners, such as Warfarin or Heparin.

DOSAGE

The minimum effective dosage for adults begins at 2 tablets, 3 times a day. Practitioner discretion may prescribe as many as 5 tablets, 3 times a day. Decrease dosage if abdominal pain develops or if stools become overly loose.

Cyathula (*chuan niu xi*) acts with *ru xiang*, *mo yao*, and *hong hua* (safflower) to treat musculoskeletal pain. It also guides the effects of the formula downwards to strengthen its effects on the lower body. *Chuan niu xi* enters the liver and kidney channels to strengthen sinews and bones and assist with the healing of traumatic injury.

Siler (*fang feng*) is added to prevent pathogenic invasion of wind-damp-cold, which could lead to the development of *bi* syndrome.

Spatholobus (*ji xue teng*) has been added as a deputy herb to relieve pain. This herb enters the liver channel to relax sinews and tendons. It also has the ability to open channels and collaterals to unblock stagnation, thus relieving pain. *Ji xue teng* can unblock stasis in the micro-vessels. It has a stimulating effect on the uterus and is therefore contraindicated in pregnancy.

Red peony (*chi shao*) clears heat, which is its primary action. Secondly, *chi shao* goes to the blood level to move blood stasis and acts with *ji xue teng* to open the channels and collaterals to relieve pain.

Poria (*fu ling*) is added to this formula to drain dampness that may accumulate due to inhibited circulation of blood and qi, causing swelling or edema in the area of trauma. In this way *fu ling* also contributes to reducing pain due to stagnation.

Sappan wood (*su mu*) is another ingredient that moves blood stasis and relieves pain. It acts much like *ji xue teng* to open the channels and collaterals to improve the flow of qi and blood and to move stagnation to relieve pain.

San qi is used to invigorate blood to relieve pain, stop bleeding, and strengthen the vessels. This promotes the quick healing of bruises and stops extravasation of the blood.

Angelica (*bai zhi*) is added to direct the action of this formula to the upper body and to the *yangming* level to move qi stagnation. This balances the action of *chuan niu xi*, which guides the actions of this formula to the lower body.

Rhubarb (*da huang*) is added to this formula for its ability to invigorate blood and remove blood stasis, especially when combined with *hong hua* and *dang gui*. Individuals who are sensitive and have a tendency to loose stools may experience an increased frequency of bowel movements while taking this formula.

Licorice (*gan cao*) harmonizes the herbs in the formula and guides to all twelve meridians. It also has an anti-inflammatory action.

FORMULA DISCUSSION

The emphasis of this formula is on moving blood to dispel stasis. This is the primary focus of treatment after the initial heat, inflammation, and swelling has diminished.

The secondary emphasis of the formula is on dispelling wind and dampness. When an area is injured, it is more vulnerable to the invasion of external pathogens. If treatment is appropriate and effective in the initial stages of trauma, wind-damp invasion is prevented, thus inhibiting the development of chronic *bi* syndrome.

There is often mild heat in the second stage of trauma. This may be residual from the initial trauma or new heat can be generated from secondary injury (see page 3). Though not a primary emphasis of the formula, there is some heat clearing action provided to continue clearing residual heat.

FORMULA APPLICATIONS

Trauma to Tissues

• Sprains and Strains (See page 8 for more information)

Trauma 2 Formula is best used for the second stage of trauma, after most of the heat, swelling, and redness have dissipated. This stage may be marked by significant pain and visible bruising, beginning as early as 24 hours after the injury. Range of motion may be decreased considerably.

The herbs in **Trauma 2 Formula** facilitate the movement of blood and qi so that normal circulation is restored, dead cells can be removed, and nutrients can once again freely enter the traumatized area. Additional herbs guard against the invasion of wind-damp-cold into the injured area.

Trauma to Bones

For the initial stage of bone injury, use **Trauma 1 Formula** or **Tieh Ta Formula**.

Trauma 2 Formula is substituted for either of these formulas after the initial stage has passed. When pain and stiffness are the primary symptoms and blood stasis must be resolved in order to relieve pain, use **Trauma 2 Formula**.

Post Surgical Trauma

Once the initial symptoms of heat, swelling, and inflammation have been resolved, and when pain has become the primary indication, use **Trauma 2 Formula** to relieve pain and promote healing. Use with caution when the patient is experiencing gastric distress from the use of general anesthesia in surgery, as it may make the gastric distress worse. If necessary, combine with a middle-warmer supplementing formula like **Astragalus Formula** or **Six Gentlemen Formula**.

Trauma 2 Formula may potentiate the effects of pain relieving medications.

FORMULA COMBINATIONS

Spring Wind Soft Plasters with Trauma 2 Formula

In the second stage of trauma, when redness, heat, and inflammation have dissipated and pain with swelling remain, **Trauma 2 Formula** may be taken internally and **Soft Plaster #2** or **#7** applied externally, as appropriate. **Soft Plaster #2** is used when pain is the most predominant symptom, and little or no heat remains in the 2nd stage of trauma. **Soft Plaster #7** is more neutral in temperature, not particularly warming or cooling. It is best to resolve persistent pain and aching. (For specific instructions on how to use Spring Wind's Soft Plasters and Soak/Compresses, see the paper entitled "*External Treatment of Trauma*.")

Spring Wind Soak/Compresses with Trauma 2 Formula

Another way to treat a traumatic injury in the second stage would be to combine **Trauma 2 Formula** taken internally with the use of soak/compresses externally. There are three soak/compresses that may be appropriate in the 2nd stage of traumatic injury: **Soak/Compress #8, #9, or #10**.

Soak/Compress #9 is best to prevent wind-damp invasion and move blood stasis to relieve pain. **Soak/Compress #10** is especially strong to move qi and blood and relieve sharp pain, when there is deep bruising. **Soak/Compress #8** provides the benefits of both #9 and #10, with equal emphasis.

FORMULA COMPARISONS

Traumatic Injury when there are still signs of heat/ inflammation (up to 2 weeks after initial injury)	Use Trauma 1 Formula
Traumatic injury with secondary injury caused by movement of the injured area	Use Trauma 1 Formula or Tieh Ta Formula
Traumatic injury in first or second stage when there is little or no heat, and pain and bruising are the primary symptoms	Use Tieh Ta Formula
Traumatic injury in second stage with inflammation obviously diminishing. Pain is greater than heat , but heat was recently a major manifestation	Use Trauma 2 Formula
Traumatic injury with internal or external bleeding	Use San Qi Formula
Traumatic injury with internal or external bleeding and inflammation	Use San Qi Formula
Recovery from traumatic injury, after all inflammation has passed, and primary stasis has been dispersed	Use Bone & Sinew Formula
Traumatic injury where pain has become chronic and/or is aggravated by weather changes	Use Bone & Sinew Formula
Post-surgical trauma with bruising and little or no inflammation	Use Tieh Ta Formula or Trauma 2 Formula
Post-surgical trauma with bleeding	Use San Qi Formula
Post-surgical trauma with bleeding and inflammation	Use San Qi Formula
To reduce the chance of permanent scarring after injury or surgery	Use Tieh Ta Formula
Post-traumatic stress disorder after injury or surgery	Use Tieh Ta Formula

NOTE: *Traumatic injury* includes sprains, strains, ligament tears, cartilage damage, tendon tears, fractures, surgery (post-operative), contusions, torn muscles, joint dislocations, and moderate to severe sports injury.

BONE & SINEW FORMULA ZHENG GU XU JIN FANG

ORIGINS: A modern formulation based on traditional principles.

Bone & Sinew Formula (*Zheng Gu Xu Jin Fang*) is a modified combination of two classics, *Du Huo Ji Sheng Tang* (**Duhuo and Loranthus Formula**) and *Shu Jing Huo Xue Tang* (**Course & Quicken Formula**). Additional herbs were added to support the kidney function to help knit the bones and sinews.

GENERAL SIGNS/SYMPTOMS

Bone & Sinew Formula was designed to treat stage three of traumatic injury to bone, tendon, ligament, and cartilage. Stage three begins when symptoms of aches and pains, stiffness, and limited range of motion have entered the chronic phase, or when the body's response to injury has become focused on tissue rebuilding. The most effective time to administer **Bone & Sinew Formula** is right after the primary blood stasis has been resolved and there is little or no remaining inflammation. In the case of a broken limb that has been set and cast, this time would occur about at the midpoint of the cast period.

ACTIONS

1. Dispels wind and dampness
2. Knits bones and sinews
3. Tonifies and moves blood
4. Relieves pain

INGREDIENTS

PINYIN	PHARMACEUTICAL	ENGLISH	PERCENT OF FORMULA
Sang Ji Sheng	Taxilli (herba)	Loranthus, Chinese Mistletoe	10%
Dang Gui	Angelicae sinensis (radix)	Chinese Angelica root	8%
Shen Jin Cao	Lycopodii (herba)	Clubmoss, Lycopodium	8%
Hong Mao Wu Jia	Acanthopanax Giraldui (cortex)	Acanthopanax stem bark	8%
Ji Xue Teng	Spatholobi (caulis)	Spatholobus stem	8%
Du Zhong	Eucommiae (cortex)	Eucommia bark	8%
Du Huo	Angelicae Pubescentis (radix)	Pubescent Angelica root	8%
Gu Sui Bu	Drynariae (rhizoma)	Drynaria rhizome	7%
Bu Gu Zhi	Psoraleae (fructus)	Psoralea fruit	7%
Xu Duan	Dipsaci (radix)	Japanese Teasel root, Dipsacus	7%
Ru Xiang	Olibanum	Frankincense	6%
Mo Yao	Myrrha	Myrrh	6%
Qiang Huo	Notopterygii (rhizoma seu radix)	Notopterygium root and rhizome	5%
Hong Zao / Da Zao	Jujubae (fructus)	Jujube fruit, Chinese Red Date	3%
Zi Ran Tong	Pyritum	Pyrite	1%

GENERAL INDICATIONS

- Second and Third stage of traumatic injury
- Fractures and broken bones
- Bone weakness or degeneration
- Cartilage damage
- Torn ligaments and tendons
- Sprains
- Disc degeneration, herniation and prolapse
- Post arthroscopic or other limb / joint surgery
- Post-traumatic onset of *bi zheng* syndrome
- Sciatic pain
- Osteoporosis
- Femoral avascular necrosis

SYNERGY OF INGREDIENTS

Loranthus (*sang ji sheng*) and Chinese angelica (*dang gui*) are the chief herbs in **Bone & Sinew Formula**. *Sang ji sheng* is the chief herb in the classic formula *Du Huo Ji Sheng Tang* (**Duhuo and Loranthus Formula**), while Chinese angelica (*dang gui*) is one of the chief herbs in the classic formula *Shu Jing Huo Xue Tang* (**Course & Quicken Formula**). Both formulas are combined in this modification.

FORMULA ACTIONS

- Dispels wind and dampness
- Knits bones and sinews
- Tonifies and moves blood
- Relieves pain

TONGUE

Red-purple or light purple with distended veins under tongue. May have thin white coat.

PULSE

Choppy, tight or wiry, may be weak from atrophy.

CONTRAINDICATIONS / CAUTIONS

Contraindicated during pregnancy.

Use with caution with heparin and coumadin or any antiplatelet and anticoagulant drugs.

Sang ji sheng has a strong diuretic effect, and therefore may potentiate the effects of diuretic medications for hypertension.ⁱ

DOSAGE

The minimum effective dosage for adults begins at 2 tablets, 3 times a day. Practitioner discretion may prescribe as many as 4 tablets, 3 times a day. Decrease dosage if abdominal pain develops or if stools become overly loose.

Sang ji sheng is acrid, bitter, and warm, enabling it to dispel wind-dampness. It is the sage herb for treating *bi zheng* syndrome. It combines with eucommia (*du zhong*) to tonify the liver and kidney in order to strengthen sinew and bone and relieve pain.

Dang gui is the sage herb for tonifying and invigorating blood to relieve pain. In combination with blood moving herbs, *dang gui* is commonly used in Chinese hospitals to treat traumatic injury. It provides nourishment to the bones and sinews to promote healing and reduces scarring.

Lycopodium (*shen jin cao*) has a specific action on the liver channel. It treats tightness in the sinews, especially due to traumatic injury. Acrid, warm, and dispersing, it acts to release tendon/joint pain and treat *bi zheng* syndrome.

Acanthopanax (*hong mao wu jia pi*) directs its action to the kidney and liver. Its acrid, warm, and bitter qualities dispel wind-dampness and tonify kidney and liver to relieve *bi zheng*. *Hong mao wu jia pi* also has a drying effect, much like the diuretic actions of *sang ji sheng*, but stronger.

Spatholobus (*ji xue teng*) has much the same effect as *sang ji sheng* and *wu jia pi* to relieve painful obstruction. The added advantage of *ji xue teng* is its ability to tonify the blood and invigorate blood flow in the micro-vessels. Research has shown that *ji xue teng* can increase neutrophil and RBC counts. In that sense it is also similar but not as strong as *dang gui*.

Eucommia (*du zhong*) and dipsacus (*xu duan*) are combined because of their synergistic action to strengthen sinew and bone and tonify liver and kidney. *Xu duan* adds the ability to invigorate the flow of blood in the channels and collaterals, lessening the pain and increasing the healing of traumatic injuries.

Pubescent angelica (*du huo*) and notopterygium (*qiang huo*) also act together to dispel wind-cold-dampness and relieve pain. Though these two herbs were used interchangeably in the early history of Chinese medicine, there are some distinct advantages to each. *Qiang huo* can release the exterior and acts primarily on the upper body. *Du huo* acts on the liver channel, and therefore benefits the sinews as well as bone. *Du huo's* action is primarily on the lower body to dispel wind, cold, and dampness, and relieve pain.

Drynaria (*gu sui bu*) and dipsacus (*xu duan*) act together to strengthen bone and tendon, to promote healing, and invigorate blood flow to reduce swelling and relieve pain. *Gu sui bu* is stronger in its action on the kidney and has been shown to increase bone absorption of calcium, thus aiding in recovery from bone fractures and in prevention and treatment of osteoporosis.

Psoralea (*bu gu zhi*) is a warm herb which supplements kidney yang and *jing*. Often combined with *du zhong* to treat low back pain due to kidney yang qi and *jing* deficiency, this herb also warms spleen yang to promote the transformation and transportation function of the spleen. This action contributes to strengthening the muscles.

Frankincense (*ru xiang*) and myrrh (*mo yao*) are combined as a strong blood moving combination with analgesic effects. The additional advantage of *ru xiang* is its ability to relax tendons and relieve musculoskeletal pain. *Mo yao* is stronger to disperse blood and eliminate blood stasis. Both *ru xiang* and *mo yao*, generate flesh and promote healing.

Jujube (*hong zao, da zao*), provides support to harmonize and soothe the middle burner. It helps with the assimilation of some of the herbs that may be hard on the middle burner such as *ru xiang* and *mo yao*, both of which can cause nausea. Additionally, *da zao* supplements qi and nourishes blood.

Zi ran tong is pyrite, a mineral that has the ability to assist with the healing of bone fractures. It also relieves pain and swelling from traumatic injury. For bone fractures it is often combined with *dang gui, qiang huo, gu sui bu* and *ru xiang*, just as it is in this formula.

FORMULA DISCUSSION

The two classic formulas that are the basis of **Bone & Sinew Formula** were created to treat two different types of *bi zheng*, chronic obstruction syndrome. The emphasis of one is nourishing the kidney and liver; the emphasis of the other is the supplementation and invigoration of blood. This modification of the two formulas makes it ideal for treating third stage traumatic injury by combining both actions in order to support the liver and kidney function of re-knitting bone and sinew. Additionally, it reduces pain from stasis, and expels external pathogens that exacerbate obstruction.

Stage three of traumatic injury begins well before chronic *bi* syndrome develops. In fact, if treated properly, and in a timely manner, even where there is severe injury, the development of chronic *bi* can be avoided altogether. Stage three begins when the inflammation has subsided and enough debris has been

cleared from the area to allow for angiogenesis. Even in severe injuries, this may be possible as early as one week after the initial injury—well before *bi* syndrome would have a chance to developed. When used to facilitate tissue rebuilding immediately after second stage trauma has passed, **Bone & Sinew Formula** can help prevent *bi* syndrome by expelling wind, cold and damp, while helping to form strong new tissue. Moxa treatments can facilitate this objective.

Whereas tissue rebuilding always occurs when tissue has been damaged, the re-building process does not always require outside facilitation. The body is actually quite effective at self-repair; minor injuries do not require stage three treatment. Third stage treatment is only necessary when the tissue damage is severe enough to warrant help with reconnection. Broken bones, torn tendons, ligaments, or cartilage usually can benefit from the use of formulas like **Bone & Sinew Formula**. One good rule of thumb to determine the necessity of treatment for third stage traumatic injury is this: if the injury requires setting or a period of isolation (such as cast or sling), or if the inflammation phase lasts for more than a week, the healing process will most likely benefit from third stage treatment.

MODERN APPLICATIONS

Femoral Avascular Necrosis

Femoral avascular necrosis is the weakening of the femoral head of the thigh bone (femur). This condition leads to the collapse of the hip joint due to bone cell necrosis. It is most commonly seen in the elderly or after traumatic injury to the hip joint, preceded by osteoarthritis in most cases. Avascular necrosis can also be seen in the wrist or ankle, but has the most serious complications when it occurs in the hip joint. Long-term disruption of the blood circulation will cause deterioration of the bone and eventually soften or weaken the bone structure, leading to collapse under stress.ⁱⁱ In Oriental medicine terms, long-term kidney deficiency or declining kidney essence and stagnation of local qi and blood can lead to the weakening of the bone and collapse of the joint. Many factors increase the incidence: chronic use of steroids, trauma to the hip joint, poor development of the hip, and alcoholism.ⁱⁱⁱ

Many of the herbs in **Bone & Sinew Formula** have been shown to strengthen bones and sinews, or move and supplement the blood, thus nourishing the injured area and limiting the potential for necrosis. Those herbs include: *xu duan*, *gu sui bu*, *du zhong*, *sang ji sheng*, *ji xue teng*, and *dang gui*. Pyrite (*zi ran tong*) is another herb included in **Bone & Sinew Formula** that has been found to be specifically helpful in treating avascular necrosis by strengthening bone and dispersing stagnant blood.^{iv}

Post-Traumatic Osteoarthritis

Post-traumatic osteoarthritis, also known as Degenerative Joint Disease, is a disease of the bone and connective tissue characterized by loss of articular cartilage and hypertrophy of the bone, producing osteophytes. This progressive condition results in pain and gradual loss of range of motion.^v From the perspective of Chinese medicine, *bi zheng* syndrome, or painful obstruction, results from the stagnation of local qi and blood in the joints. This is complicated by underlying qi and blood deficiency, with dampness, wind, heat, or cold pathogens that have accumulated in the joints. **Bone & Sinew Formula** may be used in the 2nd and 3rd stage of trauma to prevent the development of *bi zheng* syndrome. This not only relieves the current pain caused by stagnation of qi and blood from the trauma, but also affects the long-term health of the joint by dispelling pathogens before they are able to accumulate.

Lumbar Disc Herniation

Bone & Sinew Formula has the ability to treat both the branch and the root conditions of lumbar disc herniation. By supporting liver and kidney function, expelling wind, damp, and cold, and dispersing qi and blood stagnation, **Bone & Sinew Formula** can effectively treat this condition. By supporting the kidney, many of the herbs in this formula are drawn to the lumbar. Once guided there, the invigorating action can help reduce swelling and diminish pain.

Osteoporosis

Osteoporosis is the slow deterioration of bone density that happens from age 30 onwards in both

sexes. This bone loss seems to accelerate during the peri-menopausal and post menopausal years in women, due to sharply declining levels of estrogen during this period. More women die from the repercussions of osteoporosis than from cancer of the cervix, uterus and breast combined.^{vi}

Bone & Sinew Formula can support the kidney and liver to help rebuild and strengthen bone, while at the same time moving qi and blood stagnation and relieving pain. *Gu sui bu* is a key ingredient because of its ability to increase calcium absorption in the body.^{vii}

Sciatic Pain

Sciatic Pain is a very common type of back, hip, gluteal, and leg pain that radiates from the lumbar region, buttocks or hip joint down the leg, past the knee, sometimes to the foot. It can be severe and debilitating, even to the point of causing the patient to be unable to bear weight on the affected leg. This is generally due to the constriction of the sciatic nerve.

Bone & Sinew Formula acts directly on the lumbar and lower body to nourish the tendons and sinews, which promotes relaxation and flexibility of the tendons, while at the same time moving qi and blood to relieve pain. Recovery from sciatica has been recorded with 81% effectiveness using many of the ingredients in **Bone & Sinew Formula**.^{viii}

FORMULA COMBINATIONS

Bone & Sinew Formula and Essential Yang Formula

These two formulas can be combined to treat *bi* syndrome and low back pain due to kidney yang deficiency. **Though Bone & Sinew Formula** has ingredients that tonify the kidney and liver, combining it with a formula that is focused on warming and supplementing kidney yang can be advantageous when treating this condition when there is marked deficiency.

Bone & Sinew Formula and Rehmannia Six Formula

Bone & Sinew Formula can treat osteoporosis, osteoarthritis, and sciatic pain when due to liver and kidney yin deficiency if it is combined with **Rehmannia Six Formula**. **Rehmannia Six Formula**, the classic *Liu*

Wei Di Huang Wan, can provide supplementation for the root cause allowing **Bone & Sinew Formula** to address the branch symptoms.

^{vii} Zhong Yao Xue *Chinese Herbology*, 1998, pp. 802-803.

^{viii} Shi Yong Zhong Yi Yao Za Zhi, *Journal of Practical Chinese Medicine and Medicinals*, 1996; 2:18.

Bone & Sinew Formula and Bupleurum & Tang Kuei Formula

When lower back pain, sciatica, osteoarthritis, or pain from traumatic injury are exacerbated by liver qi stagnation and spleen qi and blood deficiency, this combination of formulas can work synergistically to relax sinews, relieve pain due to liver qi stagnation, and open channels and collaterals to relieve pain.

Bone & Sinew Formula and Free & Easy Wanderer Plus

Free and Easy Wanderer Plus is the same formula as **Bupleurum & Tang Kuei Formula**, with modifications to make it stronger to invigorate blood and clear heat. Use instead of **Bupleurum & Tang Kuei Formula** if there are heat signs, especially in the liver.

Bone & Sinew Formula and Restorative Formula

This combination of formulas is ideal when treating osteoarthritis and chronic lower body pain in the muscles, tendons, and joints for patients who are elderly or feeble. **Restorative Formula** supports and supplements the qi, blood, yin, and yang, while gently invigorating the blood. It provides extra support for those patients with weak constitutions.

Endnotes

ⁱChen, J., "Recognition and Prevention of Herb-Drug Interactions," *Medical Acupuncture*, Fall/Winter, 1998/1999, 10:2, 9-13.

ⁱⁱ Beers, Mark H. and Robert Berkow, Ed. *The Merck Manual of Diagnosis and Therapy*. 17th Ed. Whitehouse Station, NJ: Merck Research Laboratories, 1999, p. 453.

ⁱⁱⁱDharmananda, Subhuti. "Treatment of Avascular Necrosis of the Femoral Head with Chinese Herbs." Institute for Traditional Medicine (online database), December 2002, pdf file, p. 1.

^{iv} *ibid.*, p. 6.

^v Beers, *op. cit.*, p. 449.

^{vi} Lyttleton, Jane, "Topics in Menopause—Part Two, Osteoporosis: A Discussion," *Journal of Chinese Medicine* 34: 5, 1990.

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