**Lecture**

**“Trauma rehabilitation”**

**A Basic Rehabilitative Template**

Injuries can be classified into 13 types: abrasions, contusions, strains, ruptures, sprains, subluxations, dislocations, fractures, incisions, lacerations, penetrations, perforations, and punctures. This paper will not detail the management of burns or injuries requiring referral for operative correction, suturing, or restricted chemotherapy.

**Objectives**

Except for the most minor injuries, traumatized neuromusculoskeletal tissues are benefited by alert restorative procedures. The more serious the injury, the more prolonged is and the greater the need for professionally guided rehabilitation. The first step in rehabilitation is to explain to the patient that rehabilitation is just as important as the initial care of the injury.

The goal is not only to restore the injured part to normal activity or as near normal as possible in the shortest possible time but also to prevent posttraumatic deterioration. It is an individualized process that requires patient dedication. The author recognizes that it is easier to write about comprehensive planning than to motivate some patients to follow prescriptions after pain has subsided.

Most authorities would agree with Harrelson when he lists the goals of rehabilitation as

(1) decreased pain;

(2) decreased inflammatory response to trauma;

(3) return of full pain-free active joint ROM;

(4) decreased effusion;

(5) return of muscle strength, power, and endurance; and

(6) regain of full asymptomatic functional activities at the preinjury level (or better).

One should keep in mind, however, that the goal of decreasing the inflammatory and effusion response does not mean to eliminate it. It is a normal response that should be controlled, not expunged.

These normal responses are necessary to spur natural repair and regeneration processes. Unfortunately, the responses often manifest to a greater degree than need. Thus, control of the mechanisms, not their obliteration, is the clinical directive. Healing is also influenced by the age, tone, health, psychic, and nutritional status of the victim.

The protocols of clinical chiropractic are based on logic in harmony with nature. For example, we know that a small skin cut that normally heals in a few days takes months to heal in a completely sterile environment (eg, within a sterile bubble). This suggests that common airborne particles, bacteria, air currents, etc, act as stimulants to the healing process. It does not mean that secondary infection should be invited.

**Basic Effects of Trauma**

No injury is static: It continues to produce harmful effects on the injured person until either the injury or the person is defeated. As these effects are similar, the response to injury is also both systemic and local. It is for this reason that injuries and their effects must be evaluated from the standpoint that the *whole person* is injured and not from the view that an otherwise well-off person is afflicted with a local disability or that only a part of the total system is affected.

Since the effects of injury and the body's efforts to defeat them are constantly changing, the doctor cannot rely on one observation or one outstanding symptom in evaluating the condition of the patient, especially one seriously injured. Repeated observations must be made and indications of the patient's circulatory condition, neural expression, temperature, blood pressure, pulse, respiration, color, strength, vitality, and emotional status must all be considered to obtain as clear a picture as possible of the patient's holistic condition and what treatment may be required at the moment the particular observation is made.

**Managing Patient Discomfort**

The triune of pain, tenderness, and local swelling is the primary index for evaluating the progress of recovery. Anesthetized joints will never reveal that overstress was suffered. Without the warning signal of pain, the physician has no guideline for controlling the rehabilitative program. Thus, a compromise must be made between patient comfort and rehabilitation control.

Though extensive and prolonged immobilization assures a less painful recovery in most instances, it always carries with it related fibrosis and atrophy. On the other hand, quickly but logically initiated and gradual rehabilitation speeds the reduction of swelling and tenderness, and minimizes fibrosis and atrophy.

Enforced inactivity following major surgery leaves an indurated scar of thick fibrous tissue that remains tight and uncomfortable for a long time after surgery. Likewise, major joint and skeletal injury inevitably result in overabundant scar tissue from necessary immobilization. Even minor disorders treated with long-term immobilization develop large scar masses that permanently restrict function. On the other hand, uncomplicated surgery, wounds, and sprains followed by ambulation in a few days result in a cicatrix that is not tight, but rather soft and pliable.

Until recent years, the standard treatment for a sprained ankle was 3 days in a plaster boot, followed by 3-4 days of radiant heat and whirlpool baths, and then crutches for another week, all totaling about 2 weeks of therapy. The result was an individual exhibiting a distinct limp for 2-4 weeks and an indurated leather-like ankle where motion was restricted in all normal arcs. It was not uncommon to take several months before the ankle was considered functionally normal.

Today the procedure and results are much different. For instance, several years ago the Athletic Department of Yale University found that the same type of injury put on a regimen of straps and cold packs for 1 or 2 days, supported walking the 2nd day, and jogging to tolerance the 4th day will exhibit a normal-looking ankle on the 5th or 6th day with subsiding tenderness (localized only) and no evidence of edema. With external support, the athlete is able to return to competition. This would appear to be a worthy objective within and without athletics, if not mandatory, to carefully control rehabilitation toward full return of function with minimal scar tissue and thus minimal fixation (motion restriction).

**Work vs Athletic Injuries**

Occupational injuries are similar to athletic injuries with the exceptions related to the usually better conditioned athlete. Work injuries frequently comprise prolonged microtrauma; athletic injuries often involve recurrence of sharp acute trauma. Injuries suffered at work or during competition vary from minor to severe. A severe knee injury from a harsh clip in football may be more or less severe than that suffered from a worker falling from a platform or struck by a moving machine.

Nonclinical obstacles may be encountered. The care of the athlete can be complicated by parents, coaches, the press, game schedules, and player motivation. The care of the worker can be complicated by employers, union representatives, workers' compensation conventions, attorneys, and worker motivation.

**TEMPLATE OF CLINICAL MANAGEMENT ELECTIVES RATIONALE**

Clinical templates form the customary basis of case management in each of the healing arts. Such templates are deduced from established general protocols. They should be regarded as a pattern for thought or an area mapped for consideration. They should never be used as a recipe book offering "this for that" solutions. They are not unyielding instructions or parameters having strict boundaries. Rather, they should be viewed as general directives that invariably have exceptions and invite modifications to meet the needs of the specific patient and unique conditions at hand.

**Cautions**

A doctor is judged by his or her clinical judgment, not on the use of a particular template, protocol, or philosophy. The phrase *clinical protocol*, as used here refers to a standard, an orderly set of procedures, or a generally accepted assemblage of efficient clinical rules.

Neither templates nor protocols should be used to encircle thought or chain rational creativity. They invite a certain course of action but do not demand that a specific path be taken. They may outline customary procedures, but they should not deny the possibility of inventive necessity. It is likely that 200 years from now, physicians will look back at the clinical practices of today with the same wonder as we look back at the accepted protocols of bleeding, induced vomiting, and avoidance of bathing that were considered ideal standards of practice 2 centuries ago.

With the above caveats in mind, the reader will find consideration of the following guidelines highly rewarding in the rehabilitative therapy.

**Physiology of Connective Tissue Healing**

The first response to trauma is a local reflex vasoconstriction that decreases blood flow and oxygen supply to the area. Area cells are disrupted by the injury or die of the hypoxia. Cell death or degeneration releases potent enzymes inducing vascular changes. Notably, histamine release increases capillary permeability allowing the escape of plasma and blood proteins and cells into interstitial spaces. The quantity of colloids increases concurrently in the surrounding tissues, thus reversing their normal effect by pulling more fluid into interstitial spaces rather than back into the capillaries. These processes are recognized as early posttraumatic swelling.

Second-phase reaction initiates the repair process, which is simply explained by Knight and Hettinga. It is explained that during the initial vasoconstriction the reduced blood flow allows white blood cells to migrate to the margin of area vessels and adhere to their walls, eventually migrating into interstitial spaces. Once there, the white cells begin to remove foreign matter (extrogenous particles and debris from dead cells) by phagocytosis.

The first white cells at the scene are neutrophils that have a hunger for bacteria. Macrophages then arrive and phagocytize neutrophil carcasses, cellular debris, fibrin, red cells, and other wreckage that may impair the healing process. Unfortunately, destroyed neutrophils release proteolytic enzymes into the inflammatory fluid of the area. These enzymes hasten hydrolysis of proteins into simpler substances and readily attack joint tissue. Thus, although this is the natural response of ridding the body of foreign and toxic substances, a lengthened continuation of this response can severely damage joint structures.

Once bleeding stops, some degree of hematoma is formed and resolution begins to organize thrombi to form richly vasculated granulation tissue. Nature's goal is now one of cleanup (by macrophages) and repair, often occurring simultaneously. For repair to take place, enough of the hematoma must be removed to allow ingrowth of new tissue. Thus, the size of the hematoma or amount of exudate is directly related to total healing time. If the hematoma can be minimized, healing begins earlier to reduce total healing time.

Joint components react uniquely to trauma. Injured synovium stimulates the proliferation of surface cells, an increase in vacularity, and gradual subsynovial fibrosis. Prolonged mechanical irritation produces chronic synovial inflammation characterized by a reversal of normal synovial cell ratios. Fibrocartilage lesions are also accompanied by increased synovial effusion.

As the synovial membrane changes, so does the content of synovial fluid -decreased viscosity, decreased concentration of hyaluronic acid, fibrin infiltration, and possibly hemarthrosis. In synovitis, synovial cells are destroyed. White blood cells ingest cellular debris, lysomes, and proteolytic enzymes, and then die in the transudate. This, in turn, releases the proteolytic enzymes and produces a vicious inflammatory cycle perpetuating the synovitis and establishing a sequel of progressing sclerotic changes.

Articular cartilage is especially susceptible to enzymatic degradation. Proteoglycan is a protein aggregate that helps to establish the resiliency and resistance to biomechanical deformation of articular cartilage. When the proteoglycan content of articular cartilage diminishes, Sledge reports that collagen fibers become highly susceptible to mechanical damage; the cartilage softens, fissures, and erodes; denuded bone is exposed; and osteoarthritis and/or degenerative joint disease is instituted.

When the matrix fails because of the release of noxious enzymes, degradation by-products and proteoglycan are carried in synovial fluid to the synovial membrane to establish a reactive synovitis encouraged by prolonged effusion that also injures the joint capsule and properties of articular cartilage. Again, a vicious cycle can be established.

**MANAGEMENT PROTOCOLS FOLLOWING TRAUMA**

The optimal procedure is to anticipate each step in the healing process and provide the opportunity for natural processes to express themselves offering aid only when necessary. This is not to say that if a variation in the process is seen at one of the normal stages of healing that treatment should not be enhanced accordingly. For example, increased local swelling and tenderness during a late stage strongly suggest an infectious process.

**Stage 1. Acute Inflammation and Active Congestion**

This is the stage of fresh tissue damage and reaction occurring immediately after strains, ruptures, sprains, and burns. Early cryotherapy is usually applied in the form of cold packs, vapocoolant sprays, ice massage, or cold immersions for the vasoconstrictive effect in controlling swelling, hematoma size, and pain. The prudent use of galvanism also has a vasoconstrictive effect. Nontraumatic mobilization, cryotherapy, and vasopneumatic compression can do much in reducing excessive effusion.

The goal is to control the natural healing process, not to inhibit it. Any form of induced stimulation during the early portion of this stage should be avoided. The injury itself is all the local stimulation necessary for a maximum response. More harm can be done by overtreating at this early stage than doing nothing.

Scratches and small skin tears associated with abrasions, scrapes, contusions, and similar bruises should be douched with tepid distilled water to flush foreign matter, sprayed or doused with a general disinfectant such as isopropyl alcohol, and covered with a sterile pad or gauze for protection and to discourage secondary infection. If edema or bleeding is determined or imminent, cold, rest, elevation, and a compression bandage should be applied. Remote meridian or another type of reflex therapy may be beneficial in controlling pain, swelling, and shock.

Generally, the injured part should initially be protected and rested to prevent further injury or irritation by use of a compress, bedrest, a sling, crutches, a cane, a foam or padded appliance, shoelift, or another form of support should be considered to safeguard the healing processes. If motion of the injured part should be restricted, it may be temporarily immobilized by a pressure bandage, strap, rigid appliance, brace, or cast.

The major goals soon after injury are to control pain and reduce swelling by vasoconstriction, compression, and elevation; to prevent further irritation, inflammation, and secondary infection by disinfection, protection, and rest; and to enhance healing mechanisms.

Thus, common electives at this stage include:

Disinfection of open skin (eg, scratches, abrasions, etc)

Cryotherapy

      Cold packs

      Cold immersions

      Ice massage

      Vapocoolant spray

Compression

      Pressure bandage

      Aircast

Protection (padding)

Elevation

Indirect therapy (eg, reflex therapy)

      Iontophoresis or phonophoresis

      Auriculotherapy

      Meridian therapy

      Spondylotherapy (remote)

      Mild pulsed ultrasound (nonlocal)

      Pulsed alternating current (3-5 Hz)

Rest and Support

      Bedrest

      Cane

      Crutches

      Foam/padded appliance

      Shoe orthotic

      Shoelift

      Sling Immobilization

      Rigid appliance

      Strap

      Plaster cast

Diet modification

      Nutritional supplementation.

Following an acute musculoskeletal injury, especially during the first 24-48 hours, it may be necessary to treat the patient once or several times each day until the acute pain subsides. In some patients with severe articular injuries, mild multiple treatments and concentrated attention combined with bed rest is often the regimen of choice.

By virtue of the increased vascularity in an athlete's well-conditioned musculature enhanced during exercise, interstitial hemorrhage following tear, sprain, or fracture tends to be profuse. While rest, ice, compression, and elevation (RICE) are standards in the treatment of acute injury of any individual, this factor of increased vascularity in an athlete underscores the need for the immediate application of RICE.

**Stage 2. Passive Congestion**

This stage develops the framework for natural reparative mechanisms to establish a network of fibrin and fibroblasts that begins the reparative process. Like the first stage of healing, it is characterized by swelling and local tenderness. Local heat and redness are often prominent, and the tenderness is more diffuse.

After 24-48 hours, pulsed ultrasound or cryokinetics (initially with passive exercise) is often indicated for its effect on mobilizing tissue and tissue fluid, on membrane permeability, and on dispersing accumulations of fluid and metabolic by-products and posttrauma cellular debris. Ultrasound helps to increase gaseous exchange in local tissues, disperse fluids, liquefy gels, softens tissues, increase membrane permeability, and provide mild heat and massage at the cellular level. Articular fixations in the area of involvement can be treated reflexively at this time.

To reduce stubborn stasis late in this stage by enhancing venous and lymphatic drainage, alternating applications of mild superficial heat and cold, light nonpercussion vibrotherapy, cryokinetics (passive exercise initially) and/or surging alternating current are generally beneficial at this stage. These procedures also tend to free coagulates, disperse accumulations, discourage adhesion formation, and enhance the tone of local nerves, muscles, and vessels.

The major goals in this second stage are to control residual pain and swelling, provide rest and protection, prevent stasis, disperse coagulates and gels, enhance circulation and drainage, maintain muscle tone, and discourage adhesion formation.

Thus, common electives include:

Indirect therapy (reflex therapy)

      Alternating superficial heat and cold

      Pressure bandage

      Protect lesion (padding)

      Light nonpercussion vibrotherapy

      Passive exercise of adjacent joints

      Mild surging alternating curren

      Mild pulsed ultrasound

      Phonophoresis

      Cryokinetics (passive exercise)

      Meridian therapy

      Spondylotherapy

Rest

      Bedrest

      Cane

      Crutches

      Foam/padded appliance

      Shoe orthotic

      Shoelift

      Sling

      Immobilization

      Brace

      Rigid appliance

      Strap

      Plaster cast

Diet modification

      Nutritional supplementation.

Once the stage of likely recurrent bleeding has passed, a gradual rehabilitation program can be initiated to encourage the inflammatory reaction of resolution to pass quickly -thus reducing subsequent fibrous thickening of tissues. This program may be accelerated once the stage of fibrous thickening, noted through inspection and palpation, is exhibited. A great deal of atrophy, muscle weakness, and fibrous induration can be eliminated by applying progressive rehabilitation as soon as possible.

Timing, of course, must be coordinated with the type of injury; ie, bone injuries often require longer support and rehabilitation procedures than do less severe soft-tissue injuries. However, once bone heals, it is usually stronger; once soft-tissue heals, it is usually less pliable and prone to reinjury.

**Stage 3. Consolidation and/or Formation of Fibrinous Coagulant**

During this stage, the formation of tissue repair is well established. The status is characterized by fibrous deposition and a chronic inflammatory reaction featuring a distinct reduction in local redness, heat, and tenderness if the part is rested. The incidence of recurrent bleeding progressively reduces as this stage develops.

Local moist moderate heat produces mild vasodilatation, increases membrane permeability, and enhances cellular nutrition by encouraging blood flow through the area. Moderate active range-of-motion exercises, alternating traction, and sinusoidal current tend to free coagulants and early adhesions, and tone local nerves and other soft tissues. Ultrasound applied during this stage has the same effect as that explained above. Articular fixations can usually be effectively mobilized without undue pain by adjustive (manual or mechanical) technics late in this stage.

The major goals here are the same as in Stage 2 plus enhancing muscle tone and involved tissue integrity and safeguarding against factors that may interfere with natural healing processes.

Thus, common electives include:

Mild articular adjustment technics

Moist superficial heat

      Thermowraps

      Spray-and-stretch

      Cryokinetics (active exercise)

Moderate active range-of-motion exercises

Meridian therapy

Mild alternating traction

Sinusoidal alternating current

Ultrasound

Phonophoresis

Microwave

Vibromassage

High-volt therapy

Interferential current

Spondylotherapy

Mild transverse friction massage

Mild proprioceptive neuromuscular facilitation techniques

Rest

      Bedrest

      Cane

      Crutches

      Foam/padded appliance

      Shoe orthotic

      Shoelift

      Sling

      Immobilization

      Semirigid appliance

      Foam support

Diet modification

      Nutritional supplementation.

Professional care during healing requires repeated inspection and external support: (1) Periodic and regular appraisal can usually be made simply through inspection, palpation, function studies, and patient reports. When dealing with many traumatic injuries, one becomes astute in seeing and feeling the various stages of healing. (2)-Continuous support during the resolution stage should be provided by external measures without impairing the natural healing process. The common means are through tapes, bandages, splints, foam-type braces, etc.

After the acute stage of an injury has passed, attention should be given to more microscopic considerations. In the typical soft-tissue injury, external signs disappear within 2 weeks but the tissues involved may not be ready for athletic stress or heavy manual labor. Invariably, the greater the bleeding, the more acute and diffuse the inflammatory stage, and greater induration and fibrous thickening can be anticipated if not well managed.

Treatment for musculoskeletal complaints after the acute pain has subsided need not be spaced as close together as during the acute stage. Therapy is usually administered on a daily basis, then every other day, and eventually to about once per week. If pain persists after 10-15 visits, it is advisable to completely re-examine the patient and re-evaluate the initial diagnosis, seek consultation, or refer the patient for further specialized evaluation before therapy is continued.

**Stage 4. Fibroblastic Activity and Potential Fibrosis**

This stage is often called the "toughening phase." Nature responds to injury by attempting to make the part stronger, splinted, or both. The chronic inflammatory reaction and degree of tenderness subside. Palpable thickening and induration in the area of reaction can be palpated.

Physicians not well schooled in traumatology may dismiss the patient at this stage because of resolution of entering complaints. However, the disadvantageous effects of this stage are the formation of disadvantageous scar tissue, shortened soft tissues leading to contractures, muscle weakness, and reduced joint mobility likely in more than one range of motion. It is at this stage when the skill of the chiropractor can do much to prevent disability or the predisposition to reinjury.

Causes for sharp pain should be corrected by now, but some residual tenderness likely remains. The major goals are to defeat any tendency for the formation of binding adhesions, taut scar tissue, and area fibrosis and to prevent atrophy.

Thus, common electives are:

Deep heat articular adjustment technics

Spondylotherapy

Local vigorous vibromassage

Transverse friction massage

Spray-and-stretch

Active range-of-motion exercises without weight bearing

Motorized alternating traction

Negative galvanism

Ultrasound, continuous

Sinusoidal and pulsed muscle stimulation

Microwave

High-volt therapy

Interferential current

Meridian therapy

Proprioceptive neuromuscular facilitation techniques

Rest

      Bedrest

      Cane

      Crutches

      Foam/padded appliance

      Shoe orthotic

      Shoelift

      Sling

      Immobilization

      Brace

      Semirigid appliance

      Strap

      Plaster cast

Diet modification

      Nutritional supplementation.

**Stage 5. Reconditioning**

As healing becomes more complete, treatment should be directed to developing strength, tone, and length in the injured muscles, tendons, and ligaments. Therapy during this stage is frequently scheduled once (possibly twice) a week and is usually combined with a specific exercise program that is given to the patient (by demonstration/explanation and writing) to apply at home.

At this stage, the sedentary individual will believe that the injury is completely healed because pain is absent during daily activities. Joint motion appears unrestricted unless challenged. For those involved in physical labor or strenuous sports, however, the healed tissues must be reconditioned to bear the intensity of the demands required.

Thus, common electives are:

Direct articular therapy for chronic fixations

Progressive remedial exercise

Passive stretching

Isometric static resistance

Isotonic with static resistance

Isotonic with varied resistance

Plyometric

Aerobic

Diet modification

Nutritional supplementation.

      Life-style counseling

Clinical practice in this area shows there are some unique disabilities found in competitive athletics that are rarely, if ever, encountered in general practice. Each sport requires a different type of history taking and examination emphasis; and each age group (children, adolescents, adults) presents individual problems. Preadolescent participation in sports offers unique risks and professional challenges. Likewise, an increasing number of senior citizens maintain a degree of fitness through tennis, golf, bowling, jogging, volleyball, and other sports that are not without risk.

These factors are added to the usual variances seen in general practice such as degree of maturation, body type, effects of past illnesses and surgery, congenital abnormalities, gender variances, and so forth. As a rule, athletic rehabilitation must be carried beyond the usual range considered to be full function. Last, but far from least, is the particular athlete's motivation and career aspirations that must be carefully appraised in terms of fitness and the patient's short-term and long-range goals.

**GENERAL DIRECTION IN MANAGING**

**THE CHRONIC MUSCULOSKELETAL INJURY**

Many chronic joint disorders seen in a chiropractic office present with two underlying periarticular muscle-ligament conditions: one or more muscle groups that are in a weakened state and a shortened and spastic condition of their antagonists. It is presumed that this functional imbalance, which leads to both physiologic and biomechanical overstress, is the primary cause of most articular disorders. Thus, adjunctive therapy in articular disorders should be directed to the involved joint(s) to correct this imbalance by strengthening certain muscles and ligaments, and stretching others. If not, the effects of therapy are likely to be effective only short term and recurrence of the problem (either locally or somewhere else in the kinematic chain) can usually be expected. If this hypothesis is often true, then the clinician can expect to find weak extensors associated with shortened and tight flexors, or vice versa, and weak abductors often associated with short-tight adductors, and vice versa.

These syndromes are common in many low-back pain cases where we find weakened abdominals associated with short-spastic deep lumbosacral extensors. While light palpation may indicate normal tone of the superficial erectors, deep palpation will invariably reveal hard-inflexible tissues. Observation from the side will often reveal in a sedentary patient a pot-bellied individual, an extremely sharp lumbosacral angle (due to an anteriorly rotated pelvis), and a relatively flattened lumbar and thoracic spine above. This picture does not fit the overconcern in most textbooks with lumbar hyperlordosis and thoracic hyperkyphosis.

An imbalance syndrome in the extremities such as in the shoulder, elbow, wrist, knee, and ankle is much more subtler. Yet, careful examination will demonstrate its presence. For example, it is rare to find a meniscus disorder of the knee not associated with a weak quadriceps (especially a vastus medialis) and short-tight hamstrings. Likewise, it is rare to find a case of shin splints not associated with weak anterior muscles and taut calf muscles.

**Primary Objectives of Case Management**   A large percentage of traumatic joint injuries can be avoided with proper conditioning, training, and practice. After injury, the following three points are the general aims of good case management.

**Reduce and Absorb Swelling**   Early cold, compression, elevation, and rest will do much to avoid the hazards of excessive swelling. Heat, massage, and exercise are contraindicated in the early stages, but beneficial in the later stages. Aspiration is contraindicated unless necessary for diagnosis or relief of severe pressure. To prevent capsular stretch from chronic effusion, local compression, elevation, contrast baths, and muscle activity are beneficial after 48 hours. Normal joint movement and tendon function cannot be achieved until periarticular swelling has been absorbed

**Minimize Deformity and Wasting**   An attempt should be made to normalize existing deformity, mechanical obstruction, and articular irregularities so that normal joint motion and configuration can be achieved. Joint stability must be achieved by conservative measures (eg, manipulation, physiotherapy, proprioceptive neuromuscular reeducation) or surgical and postoperative rehabilitative methods. Progressively increased exercises are necessary to minimize muscle wasting which rapidly follows joint trauma. A protective reflex muscle spasm may interfere with early rehabilitation. It is best treated with cold and cryokinetics.

**Normalize Joint Movements and Function**   Progressively increased remedial exercises of a well-supported joint help to restore normal joint motion. Support should not restrict motion in an unaffected plane. Once the joint's full range of normal motion is obtained painlessly, strength-developing and skill exercises can be carefully incorporated with emphasis upon rhythm to avoid tissue breakdown.