The Physicians Approach to Evaluating and managing RSD/CRPS

Definition
- Continuous pain in a portion of an extremity after a precipitating event due to SNS dysfunction
- Complex Regional Pain Syndrome
  - Type I – no specific nerve injury
  - Type II – nerve injury

~2003~
RSD / CRPS Diagnostic Criteria
- International Research Foundation for RSD / CRPS
- The presence of an initiating noxious event, or a cause of immobilization.
- Continuing pain, alldynia or hyperalgesia with which the pain is disproportionate to the inciting event.
- Evidence at some time for edema, changes in skin blood flow, abnormal sudomotor activity, impairment of motor function* or changes in tissue growth (dystrophy and atrophy)* in the region of the pain.

Clinical Features
- Pain (Alldynia/Hyperpathia)
- Movement Disorders
- Swelling (Brawny Edema)
- Skin Changes (vasomotor, atrophy)
- Spreading
- Bone changes

Signs & Symptoms
- Sensory
- Autonomic
- Motor
Sensory
- Allodynia
- Hyperpathia

Autonomic
- Trophic
- Sudomotor
- Temperature

Motor
- Muscle spasm
- Tremor
- weakness

Differential Diagnosis
- Antecedent event
- Central
- Iatrogenic
- Idiopathic
- Immobilization
- Infection
- Malignancy
- Musculoskeletal
- Nerve lesion
- Peripheral
- Psychological
- Rheumatologic
- Systemic
- Vascular

Plan of Care/Medical Work Up
- History
- Laboratory
- Physical Exam
- Radiologic
- Sympathetic Block
- Physical Therapy
- Occupational Therapy
- Psychosocial

Stages of CRPS/RSD
- Acute (stage I)
- Dystrophic (stage II)
- Atrophic (stage III)
- The Hand Therapists will review this in more detail
Diagnostic Tests

- Triple Phase Bone Scan
- Thermography
- Sympathetic Blocks
- Intravenous Phentolamine/Guanethedine Injection
- Drop and Swipe Test

Three Phase Bone Scan (TPBS)

- Blood flow – Blush
- Soft tissue uptake
- Bone/peri-articular accentuation

Thermography

- Liquid Crystals
- +/- 1 degree C
- Hypo >> Hyper

Sympathetic Blocks

- Three reasons to consider sympathetic blockage
  - May provide a cure or partial remission
  - Gain further diagnostic information
    - Determine what portion is being caused by the sympathetic nervous system
  - Response to block provides prognostic information about other treatments

Intravenous Phentolamine/Guanethedine Injection

- Simple and relatively inexpensive
- Most sensitive confirmation in early stages
- This test determines whether or not the patient’s pain is maintained by the SNS
- The drug blocks the sympathetic receptors from receiving circulating norepinephrine and epinephrine
- And the patient’s pain will disappear when the receptors are blocked
- Drawback – SMP vs SIP
Determining if CRPS/RSD is Present
- No single laboratory test
- Physician must piece together the subjective complaints with objective (medical history) to determine RSD
- Physician must rule out other potential life threatening diseases
- Therapist must piece together symptoms and objective findings

Looking at the patient
- Always compare to the sound limb (control) for objective findings
- 80% of patients have temperature difference compared to control limb
- Temperature changes are dynamic – changing in minutes or following exercise
- You can use a portable infrared thermometer to measure

Spreading Symptoms
- Generally localized
- As disease progresses symptoms may become diffuse

Spreading Symptoms
- Maleki, et al describes three patterns
- Continuity (spread upward to hand to shoulder)
- Mirror image (spread to opposite side)
  - First described by Mitchell (Civil War)
  - Independent Type
  - Spread to a distant region of the body

Movement Disorder
- Inhibitory effect of RSD on muscle contraction
- Difficulty initiating movement
- Presenting as a “Stiff” hand
  - Most noticeable after sympathetic block when the “stiffness” disappears

Movement Disorder
- Lack of movement will lead to muscle wasting (disuse atrophy)
- Interestingly, some have reported NO pain but a great deal of stiffness or initiation movement
- Tremors and involuntary severe jerking
- Sudden onset of spasms (cramps)
- Increased tone (dystonia)
Diathesis
- Definition:
  - An individual disposition that causes susceptibility to a given disease

Two different types recognized in RSD
- *Sympathetic nerve activity
- *Psychological makeup

Sympathetic Nerve Activity
- History of sweaty palms
- Pallor
- Excessive coolness of fingers & toes when exposed to colder temperatures
- Peripheral Vasoconstriction and poor capillary refill of uninvolved extremity
- Fainting spells, excessive flushing, Migraine headaches

Psychological Issues
- Traits that may be present in RSD patients
  - Fearful
  - Suspicious
  - Emotionally labile
  - Chronic complainer
  - Dependent/insecure
  - Unstable personality
  - Low pain threshold

Do I Look Suspicious?
Are you looking at me?

Psychological Issues
- Familiar with the RSD profile
- Food for thought:
  - Could the maladaptive behavior be brought on or intensified because of CHRONIC PAIN?
  - Physiological reasons for decreased memory, depression, pain
  - Then would the psychological manifestations disappear when the pain subsides?
Psychological Issues

- Perhaps the RSD patient may have and continues to exhibit maladaptive coping mechanisms; but that does not give us an excuse to invalidate their complaints.

Diathesis

- Patients can not control sympathetic or psychological diathesis.
- Therefore RSD cannot willfully cause this condition.

Challenge

- Psychological issues are extremely complex.
- Read about psychological manifestations and chronic PAIN.
- You must try to understand the psychological issues to deal with RSD.
  - Recommend psychological intervention.

Frustration

- Frustrated doctors, health care workers, employers, friends, and family members don’t understand RSD which greatly contributes to the vicious cycle of psychological issues and PAIN.

Treatment

- Intervention.
- Early is the key to success.

You can’t treat it unless you understand it!
Nervous Systems

- Somatic
  - Central
  - Peripheral
- Autonomic
  - Sympathetic
  - Parasympathetic

Sympathetic Nervous System (SNS)
3 main functions

- Vital signs
- Immune system
- Body temperature

Trauma-related Theory of CRPS

- Sympathetic vs somatic
- Specific for C nerve fibers
- Watershed areas

Primary effects of abnormal SNS

- Afferent pain
  - Allodynia
  - Hyperpathia
- Efferent spasms
  - Blood vessels/muscles
- Neuroinflammation
  - Cellulitis/edema
- Limbic dysfunction
  - Emotional lability
  - Memory
  - Mood swings
**OT & PT**
- Invaluable adjunct to treatment
- Education
- ADL
- Modalities
- Pain management
- Patient advocate

**Non-invasive modalities**
- Ultrasound
- TENS
- Massage
- Desensitization

**Pharmacological**
- NSAIDs
- Neurontin
- Tegretol
- Elavil
- Clonidine
- Mannitol
- Narcotics
- Sedative
- Topical

**Local Nerve Pain**
- Clonidine Patch. Studies suggest that clonidine may decrease pain in RSD / CRPS by inhibiting the sympathetic nervous system.

- Capsaicin cream. (This medication is applied to the skin and behaves like hot peppers. The effectiveness of capsaicin cream in the treatment of RSD / CRPS has not been determined).
Trigger Point Injections

- Used for decreasing muscle spasms
- Relief is short lived – weeks to months
- Solutions used
  - Lidocaine/Marcaine
  - Depomedrol
  - Botox

Nerve blocks

- Sympathetic
- Paravertebral
- Lytic

- Post-block – send immediately to the therapist

Sympathetic Blocks

- Upper Extremity
  - Stellate ganglion block (SGB)
- Lower Extremity
  - Lumbar sympathetic block (LSB)

Sympathectomy

- Mechanical vs. chemical

- Mechanical – refractory, rhizotomy, thalamotomy, or radio-frequency ablation

- Chemical – ETOH, hypertonic saline or phenol

Spinal Cord Stimulator

- Chronic intractable pain
- Low intensity, electrical impulses to trigger selected nerve fibers along the spinal cord
- Stops pain messages from being transferred to the brain
- Replaces intense pain with a tingling sensation
Spinal Cord Stimulator

- Advocated in the past but not now
- Complications
  - Idiopathic Paralysis
  - Short duration of relief
  - Proximal spreading
  - Recurrence

Intrathecal Pumps

- Two limbs affected by RSD
- Debilitating pain & one limb affected
- Delivers medication(s) at a slow drip continuous infusion rate
- Pump can be removed at any time

SIMPL

- Subcutaneous infusion for management of pain using Lidocaine (SIMPL)
- 8% lidocaine is subcutaneously infused into the patient via an ambulatory pump
- This takes place over about 4 weeks
- It is believed that lidocaine “quiets” the nervous system
- And allows the patient to participate in rehab without over-exciting the nervous system

SIMPL

- The SIMPL program enables the patient to return to daily functioning
- Research article is available in the “Clinical Journal of Pain” March 1999
- Results are preliminary but optimistic
Morphine Pump

- Best for advanced or severe cases
- Catheter is inserted under the dura which creates an infusion pump that delivers the drug directly into the CSF
- Advantages: decreased withdrawal/tolerance/addiction
- Optimal dose is 4-10 mg/day
- 50% reduction in VAS score
- #1 problem is drug-drug interactions
- Failure: due to infection, device rejection and scar formation

Amputation

- Low success rate
- Rarely performed
- Pain can spread up or to the opposite side
- Sleep disorder
- Suicide

Most of your RSD/CRPS patients will not be headed to the hand surgeon for surgical intervention!

Factors leading to Long-Term Disability

- Delayed diagnosis greater than 2 years
- Additional trauma due to surgical procedures
- Ineffective medical management
- Surgical treatment of the affected area
- Prolonged litigation
- Emotional aggravation
- Type of causalgic RSD

Case study

41 y.o female
Car accident 1 year prior
No medical treatment for hand
Pain in hand ignored
Grasp very limited
Patient does not use hand at all

Eval Continued

- Brawny edema
- Positive MCP squeeze test
- Osteoporosis on X-ray
- Contractures present
- Patient has significant pain
What is YOUR treatment plan?

Treatment Plan Dr. Baras
Case Study
- 46 y.o female
- Right hand
- CTR performed 1 year ago
- Secondary trigger finger release 6 months later
- Onset of sympathetic symptoms began immediately post-op CTR

Eval continued
- Osteopenia
- Hyperhydrosis
- Disuse atrophy
- Symptoms begin to spread up the arm
- ROM limited on entire extremity
- Pain is severe, burning, spasms, electrical quality
What is YOUR treatment plan?

What is YOUR treatment plan

Treatment Plan Dr. Baras
Case Study

- 37 y/o right hand dominant female
- Surgery for deQuervains
- Developed RSD immediately post-op
- High achiever
- Married no children

Eval

- Burning/severe pain
- Edema- fusiform
- Bradykinesia
- Extreme temperature changes
- Spasms
- No use of hand
- Shiny skin/trophic changes
<table>
<thead>
<tr>
<th>Case Study</th>
<th>Bit by pit-bull</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit by pit-bull</td>
<td>24 y/o female, right hand dominant</td>
</tr>
<tr>
<td></td>
<td>No fractures or damage to structures</td>
</tr>
<tr>
<td></td>
<td>Soft tissue injury only</td>
</tr>
<tr>
<td></td>
<td>Diagnosed with CRPS within 1-2 weeks</td>
</tr>
</tbody>
</table>
Eval
- Severe burning pain
- Slow initiation of movement
- Vasomotor instability
- Edema- soft and moveable
- Anxiety
- Excessive fear

What is YOUR treatment plan
The Therapists Approach to Evaluating and Treating RSD/CRPS

Reflex Sympathetic Dystrophy (RSD)
- Historical perspective
- Complex Regional Pain Syndrome (CRPS)
- 1995

Incidence of CRPS/RSD
- The exact prevalence of RSD / CRPS is unknown;
- Both sexes are affected, especially in women;
- Adolescents & young adults;
- New addition to 3rd ed. Clinical guidelines

Duration of RSD / CRPS
- Mild cases:
  - Last for weeks followed by remission;
- Pain may continue for years;
- Sometimes, indefinitely;
- Remission and exacerbation.

Facts in relation to the Dx. of RSD
- Abnormal function of the sympathetic nervous system.
  - Swelling
  - Movement disorder
- Changes in tissue (dystrophy and atrophy).

Video Clip
- Dr. Kirkpatrick
Stages of RSD

- Dying Concept – don’t use
- Determine your plan of care according to patient’s symptoms and complaints
- Collaborate with patient’s physicians

“Stages” of CRPS/RSD – good for reference

- Acute (stage I)
- Dystrophic (stage II)
- Atrophic (stage III)

Acute (I)

- Onset of severe, pain limited to the site of injury
- Increased sensitivity of skin to touch and light pressure (hyperesthesia).
- Localized swelling
- Muscle cramps

ACUTE (STAGE 1)

- Stiffness and limited mobility
- Skin is usually warm, red and dry and then it may change to a blue (cyanotic) and become cold and sweaty.
- Increased sweating (hyperhidrosis).
- In mild cases this stage lasts a few weeks, then subsides spontaneously or responds rapidly to treatment

ACUTE (1)

- Non-Noxious Stimuli
- Pain out of proportion
Acute (I)

- Mechanical Factors
- Loss of Range Of Motion
- Guarding
- Edema
- Early Contracture
- Disuse

Dystrophic (II)

- Maximal Intensity of Pain
- Pain becomes even more severe and more diffuse
- Swelling tends to spread and it may change from a soft to hard (brawny) type
- Hair coarse then scant,
- nails may grow faster then grow slower and become brittle, cracked and heavily grooved

Dystrophic (II)

- Spotty wasting of bone (osteoporosis) occurs early but may become severe and diffuse
- Muscle wasting begins
- Contractures begin
Dystrophic (II)

- Osteoporosis
  - Spotty
  - Diffuse
  - Bone changes –

Atrophic (III)

- Articular Joint Thickening
- Fibrotic Flexor Tendon Sheaths
- (atrophic) eventually become irreversible.
- A small percentage of patients have developed generalized RSD affecting the entire body.
Atrophic (III)

- Progressive Soft Tissue Atrophy
- Progressive Muscle Atrophy

Irreversible Functional Loss
Understanding RSD
The Therapist Perspective

CRPS/RSD is a debilitating disease involving
- Skin
- Nerves
- Blood Vessels
- Muscles
- Bones

What Happens
- Autonomic Nervous System (ANS) or sympathetic nervous system reacts to a stimulus
- No conscious control—NORMAL RESPONSE
- Reacts to injury to promote healing
- Swelling occurs to prevent one from using their limb—limiting further injury

What Happens
- Blood flow may be pumped to the muscles limiting superficial blood loss
- Blood flow is constricted causing vasoconstriction
- Blood flow increases --vasodialation
- Homeostasis
- These are all normal healthy reactions to injury

Abnormal Reaction
- Nervous system begins an abnormal, prolonged reflex in response to trauma
- The only common symptom is PAIN, usually burning
Theoretically

- Sympathetic nervous system activity causes inflammation causing the blood vessels to spasm leading to increased swelling and PAIN
- The events could lead to more PAIN
- Increased PAIN triggers another response
- And a Vicious Cycle has been established

In Summary

- The reflex does not shut down
- Reflex continues in an accelerated pace
- Produces an incredible amount of sympathetic activity
- Tenacious vasoconstriction leads to
  - Tissue ischemia
  - Increased afferent pain and a vicious cycle

Not unusual with RSD

- cycles of
  - Vasoconstriction and vasoconstriction

3 Common Nerves Involved

- Dorsal Superficial Sensory Branch of the Radial Nerve (SBRN)
- Palmar Cutaneous Branch of the Median Nerve
- Dorsal Superficial Sensory Branches of the Ulnar Nerve

SBRN - Show arm skeletal and trace Nerve

- OdeQuervain's tenosynovectomy
- OBone grafting for carpal scaphoid
- OIntravenous lines/shunts for hemodialysis

Palmar Cutaneous Branch of the Median Nerve

- Branches from Median Nerve 3cm proximal to transverse carpal ligament (1/3)
- Enters hand superficially through the carpal canal (1/3)
- Distal to the transverse carpal ligament (1/3)
- May be harmed with carpal tunnel release-incision on the ulnar side of the hand
Dorsal Superficial Sensory of the Ulnar Nerve
● Dorsal Ulnar aspect of the wrist and hand
● Common digital and proper digital branches of the median and ulnar nerves

Pain
● Sympathetic Maintained Pain (SMP)
● Responds to Sympathetic blocks
● Has not spread to CNS
● May benefit from Sympathectomy

● Sympathetic Independent Pain (SIP)
● Spread to CNS
● Does not respond to Blocks or Sympathectomy
● May need pump/catheter

Video on Objective Finding of SMP and SIP

The Therapists Evaluation of the CRPS/RSD patient or potential CRPS/RSD patient

diagnostic criteria :

● noxious event, or a cause of immobilization.
● pain, allodynia or hyperalgesia
● edema, changes in skin blood flow, abnormal sudomotor activity, impairment of motor function or changes in tissue growth (dystrophy and atrophy)

● History and physical exam
  ○ Begins when the person walk in the room...
  ○ Don’t be surprised if the initial injury is seemingly minor
● Document AROM/PROM
  ○ Look for intrinsic tightness
EVALUATION

- Strength (often difficult to assess)
  - Grip/pinch/MMT
- Sensory (demo) - SEMMS and 2 pt.
  - Do not increase allodynia
- Vascular
- ADL status

Edema Assessment
Classify the Edema

- Pitting or
- hard (brawny) edema

Pitting

Brawny

Pain – Is a hallmark of RSD / CRPS and is often out of proportion to what is expected from the initial injury.

- Severe, constant, burning throbbing, tearing, cutting, shooting and/or deep aching pain
- Allodynia is common:
- Example… tactile stimulation of the skin

Hyperpathia – this is delayed pain that typically outlasts the initiating stimulus and spreads beyond the normal borders

Hyperalgesia is pain that is greater than expected for a given stimulus
Pain

- It is important to evaluate the pain but not focus solely on it.
- The stiffness/immobility arise out of the pain cycle

Pain Evaluation

- Pain diagram
- Pain scales
- Questionnaires
- Inventories

Questions to ask about patient’s PAIN

- Is your pain constant or intermittent?
- If constant, does it vary in intensity?
- If intermittent, when do you have pain?
- How long does your pain last?
- What is the frequency? (occasional….)
- How long have you had the pain
- What is your pain like now, at rest, worst

Questions about the behavior of the pain

- Describe pain (stabbing, aching, sharp…)
- Does the pain move or spread?
- Is pain aggravated by movement? Light touch? Putting on your cloths?
- Is pain aggravated by certain postures?
- Do you have stiffness associated with pain?
- Does the pain make you wake? If yes, of often in the last 10 days.
- How DO YOU EASE your Pain?

MCP Squeeze Test

Grasp MCP and assess for pain
Asses Response to Cold

- If you touch the patient with something cool they will often have a noxious response and this is hallmark to neuropathic pain
- Drop and Swipe test is a quick assessment and easy to apply

Drop and Swipe Test
(part 1)

- Designed by the Mensana clinic in Maryland
- Simple and easy to perform
- An alcohol swab is opened and squeezed so the alcohol drops to the affected limb
- In 10-60 secs ask the patient what he feels
- If pain is dramatically increased the patient is experiencing thermal hyperalgesia
- If cold/cool it is a normal response and not thermal hyperalgesia

Drop and Swipe Test
(part 2)

- Swipe alcohol pad lightly over the affected area
- If patient responds with increased pain or withdraws the limb or tells you to stop
- The patient is experiencing mechanical hyperalgesia
- Most CPRS/RSD patients experience thermal and mechanical hyperalgesia

Document Skin/Trophic Changes

- Dry, scaly, or shiny
- Hair grows in course and then thin
- Nails are more brittle
- Nails grow faster

Shiny skin and thickened nails
Document vasomotor changes

- Warm or cool skin
- Hyperhidrosis/hypohidrosis
- Increased sweating
- Increased pilomotor changes (goose flesh)
- Mottled, red or blue appearance (does it fluctuate)

Abnormal Sweating in RSD

Abnormal Sweating in RSD

- Sensations of warmth or coolness in the affected limb without even touching it (vasomotor changes).
- Changes in skin color can range from a white mottled appearance to a red or blue appearance.
- Changes in skin color (and pain) can be triggered by changes in the room temperature.

Vasomotor instability – mottled and blue

Evaluate movement pattern

- Appears like a movement disorder
- Difficulty with initiating movement
- Reports feeling of stiffness
- Tremors
- Dystonia (abnormal posturing)
- Involuntary jerking
- Cramps/muscle spasms

Initially, RSD / CRPS symptoms are generally localized to the site of injury.

- As time progresses, the pain and symptoms tend to become more diffuse and can spread.
- As seen in video clip earlier.
Evaluate spreading
- Often localized to site of injury initially
- As time progresses the pain and symptoms tend to become more diffuse
- "continuity type" Pain can spread upward ie: from hand to shoulder
- "mirror-image type" to the opposite limb
- "independent type" Pain can spread to a separate distant region of the body

Use of Photography
- Digital camera
- Polaroid
- Video
- Still shots 35mm
- Computerized – Greenleaf
- Can show progress!!!
- Excellent for reimbursement

Psychological Assessment
- Family disturbance
- Employment status
- Dealing with change in function
- Dealing with medical professionals
- Dealing with scheduling of appointments
- Multiple operations or procedures

Highlights: Emotional Consequences of RSD
Interview with Children
- www.rsdfoundation.org
Re-eval after several weeks of rehab
Ready… Get Set…. TREAT!!!

The therapist must be supportive
LISTEN and BELIEVE!!!

Primary GOAL of THERAPY
(from Guidelines)

- Is to teach the patient how to use their affected body part through activities of daily living
- To create independence from the health care system in the shortest period.
- Learning that "to hurt is not to harm" is difficult, but it is essential to avoid re-injury and to promote functional use of the limb

Treatment of RSD

- The cornerstone in the treatment of RSD / CRPS is normal use of the affected part as much as possible
- Therefore, all modalities of therapy are employed to facilitate movement of the affected limb

Therapist attitude
Treating RSD
You can be successful

Education-- Primary
- Educate
- Educate
- Educate

Goals
- Must know patient’s expectation
- Must have clear and concise goals
  - Evolving, continuing reassessing, dynamic
- Must have a clear and concise plan of care

Treatment
- RSD/CRPS is unique meaning not like
  - Ortho
  - Neuro
  - General ortho patient

Plan of Care
- Flow Sheets
  - Examples

Diagram showing various care plans and considerations for RSD and CRPS.
GAIN TRUST

- Try to relate to the patient
- Therapist must be in control/charge of the clinic
Specific Issues

- Temperature changes -- dynamic
  - Use hot mitt
  - Use heat between exercises (home/clinic)
  - Entire limb exercises (gentle)
  - Self massage
  - Relaxation techniques
  - Biofeedback

RANGE OF MOTION - AROM

- Movement disorder
  - Slow to initiate
  - Appears stiff but is not
  - Encourage movement

Active Assisted ROM

- Can use in conjunction with massage
- Gentle joint distraction
- Stretching (gentle)

PASSIVE ROM

- CAUTION
- Used primarily when pain is controlled and diminished greatly
- Used in conjunction with sympathetic blocks
  - DO NOT OVER DO

General Exercise/Conditioning

- Excellent for increasing blood flow
- Great coping mechanism
- Excellent for health
- Encourage to incorporate into daily life
- Aerobic

Exercises

- Pool therapy
- Very critical to do exercise programs after sympathetic blocks
If patient presents with:

- Disuse atrophy
  - Therapeutic exercise
  - Change limb position
  - Prevent immobilization

Desensitization

- Hypersensitivity and allodynia – Pain without a noxious stimuli – may even be light touch.
  - Start outside the hypersensitive area
  - To avoid temporal summation
  - Maintain contact
  - Intermittent tactile stimuli of 3 seconds (touching skin and then repositioning hands) have been found to increase allodynia

Desensitization

- Always try to use everyday objects so the patient can reproduce and continue on a daily basis… examples for home
  - Using car steering wheel
  - Upholstery (furniture)

Desensitization

- Massage, manual edema mobilization
  - Excellent for desensitization
  - Increases circulation
  - Increases lymphatic and venous drainage by decreasing interstitial fluid volume

How often should the patient desensitize

- Initially:
  - 15 to 20 minute periods 5X a day
  - Pick two modalities per session
    - Cotton ball
    - Pom Poms
    - Upholstery of furniture
    - Tapping, rubbing, vibration

Hypersensitivity and ADL’s

- Adapt the situation by protecting certain areas that are hypersensitive to encourage ADL’s
  - Use gloves, splints, elastomer inserts, Tex taping,
### over the counter Liniments

- According to the 3rd Clinical Guidelines
  - Over the counter or prescription pain relieving creams may be beneficial
    - Capsaicin

### Cramps

- Heat
- Massage
  - Therapist
  - Instrument assisted
- Relaxation techniques
- Splinting
- Nutrition

### EDEMA Management

- Massage and MEM
  - Careful of temporal summation and maintain constant contact if possible
  - AROM and Elevation are the most effective and economical means of controlling edema
  - Compression: Intermittent Pneumatic compression is temporary and usually need to be followed up with compression garments

### Modalities to help gain function

- HEAT
  - Moist heat, paraffin (caution) has shown to increase blood flow to the treated area
  - Dry heat (fludio) also has shown to increase tissue temperature but the stimulation may be too much at first…

### Heating Mitt or glove

- Microwavable are nice and convenient
- Easy to use
- Inexpensive

### Whirlpool

- Literature supports w/p to be contraindicated because of the increased edema hence may increase the pain
  - About 20 minutes of optimal treatment time to benefit from the effects of heat
CONTRAST BATHS

- There is NO support in the literature for the efficacy and therefore you MUST question its use and determine if it is the best modality.

- REMEMBER to avoid extremes of temperatures and a true contrast bath would be extreme.

recommend

- Warm soaks with Epson Salts.
  - Epson Salt has Magnesium and that is soothing, helps with pain management, and edema.
  - Again, rule of thumb…. Avoid the extremes of temperature… avoid the cold and avoid the hot.

UltraSound

- Pulsed
  - 1.0 to 1.5 W/cm² over the stellate ganglion
  - Or over the peripheral nerves of the affected extremity

- Continuous
  - 0.8 to 1.2 W/CM²
    - Affected areas

Biofeedback

- Excellent adjunct to treatment
- Great for immediate feedback on
  - Muscle contraction
  - Muscle relaxation
  - Muscle activity
  - Temperature regulation

BIOFEEDBACK

- Put the electrodes on the thenar muscles to facilitate and monitor pinching tasks
  - Activation and function
TENS

- Sensations sent to the myelinated efferent fibers to bypass C fibers through:
  - Light Touch
  - Pressure
  - Proprioception

TENS

- High intensity Pulse (BURST)
  - Vasodilatory effect
  - Low frequency with short durations
    - Five pulses at 2 to 5 Hz for 45 to 60 minutes
      - Some advocate 1 Hz and 25 to 30 minutes
    - Thought to believe the serotonin level is altered increasing the vasodilation
    - Intestinal peptides respond to vasodilation via low level burst TENS

Electromesh Glove

- High Volt
- Entire glove is conductive
- Effective for generalized pain

Purpose of E-Stim

- Mask the pain to allow for joint R.O.M.
- Decrease edema
- Assist initiation of voluntary movement (NMES)
  
  Patient’s limb may “pink up”. That’s a good thing!

Warnings

- Keep intensity minimal so as not to create vasoconstriction.
- Too much intensity will actually cause vasoconstriction.
- If pain or coldness increases, STOP the E-Stim
  
  Remember, vasoconstriction is the problem in the 1st place!

RSD

- Mono or Bipolar
- Over or Proximal to the Painful Area
- Along Peripheral Nerves Where They are Superficial
Paravertebrally

For Arm: Paraspinals from T1 to T4
For Leg: Paraspinals from L1 to S1

If you can’t put the modality at the site of PAIN then…

- Proximal to the pain
- Contralateral to the pain
- Total body immersion (bath at home)

Low level Laser

- Research is underway to determine the effects of neurological pain relief
- Preliminary studies are encouraging
- Laser is effective for treating PAIN at present
  - Some suggest to avoid the thyroid area due to the iodine and it may be a photo sensitive or may cause a photochemical reaction

LASER parameters

- The THOR is FDA approved for pain relief, specifically the musculoskeletal pain
- Briefly, Photobiostimulation Therapy (LLLT) is effective in reducing pain and edema.

Laser

- Supports the natural functions of the human body
- Stimulates healing and relieves pain without the side effects
  - Increases nerve conduction & nerve regeneration
  - Increases vasodilation;
LASER to treat Trigger Points

- The Laser beam of light is excellent to treat TrPs.
- With the THOR Laser -- using the single probe.
  - With the 200mw 810 nm singe probe I am going to treat for 20 to 60 seconds which will deliver roughly 6 Joules per point/spot.

TrP in the BR

Accuracy during Laser and TrP treatment is important

When treating TrP – treat as many

- Points as necessary during each session.
- Techniques: Do not move the probe during each application
- Treat with a single probe and then a cluster probe per treatment session
- Proximal trigger point release can be very helpful to release distal pain

For a thorough course on LASER

- Please visit our website at Exploringhandtherapy.com
- And you can order the course on www.liveconferences.com
LASER and TrP -- follow up with

- Massage

TrP

- pain patches they get over the counter and place on TrP. Some have had some relief of the intensity of the pain...
- Most RSD patient’s realize they are managing, they are looking for function, minimizing pain, and to avoid a flare up or spreading.
- Complete resolution is not always possible & most likely not expected

Soft tissue dysfunction

- Myofascial techniques
- RSD patient you are rarely treating directly over the affected area and if you are it is with caution
- Begin with proximal stretches or Gross stretch

Myofascial massage

- Hypersensitivity and where they are in regards to resolving the hypersensitivity
- Avoid temporal summation...

How hard or deep do I work with CRPS

- Patient specific.
- Typically Myofascial massage technique include a light and/or deep touch.
  - The light does not imply skimming it only is to distinguish from deep TrP release therapy.
  - Deep trigger point release is usually too aggressive.

- You typically are treating proximal problems and dysfunction they don’t even realize they have
- Neuromuscular work proximally can be useful — you may even coordinate with massage therapist & teach pathology
- Relaxation is the key… allow the patient’s body to “talk to you” and you respond accordingly
Another way soft tissue mobilization can be performed is with instruments.

You can utilize instrument assisted

- Soft tissue massage with the RSD patient...
- Good control with the instruments...
- EHT has a great Myofascial course available to go our website.
  www.liveconferences.com to order and see details.

Gate Theory we want to talk about

- Melzack & Wall (1965)
- Projection neurons in the dorsal horn from the nociceptive afferent fibers may be modulated by the non-nociception afferent fibers.

GATE THEORY PROPOSES

- Substantia gelatinosa of the spinal cord.
- Some type of "gating" mechanism involved between the large primary afferents and the pain fibers.
- The theory provided some rational for many clinical observations and gave rational to TENS, Dorsal Column stimulators.

Closing of the GATE

- Thought to occur in the Lamina II of the dorsal horn (substantia gelatinosa)
- NEW EVIDENCE --gating mechanism also occurs in the dorsal root and the midbrain.
- The original gate control theory has been refined and some question about the theory

Endorphin Theory

- Laser
- TENS
- Myofascial Massage
Encourage Functional Exercises

Exercises

- Closed chain exercises are good for tissue stressing
  - Caution because closed chain exercises promote movement and you may want to begin with the stress loading (dystrophile) program
  - The stress loading component of closed chain may increase pain with some patients

Stress Loading Program -- History

- Watson and Carlson advocate the three component stress loading program
  - Compressive loading of the UE
  - Distraction
  - And use of other modalities of treatment
  - DEMO dystrophile

Dystrophile

- SCRUB: Advocates to begin with 3 minute sessions and work up to 10 minute sessions
  - Home use a scrub brush
- Carrying start with ½ pound to 1 pound increasing weight as tolerated up to a 10 minute session

Scrub

- Quadruped on the floor
- Lean on arm and “scrub” motion
- Shoulder should be directly over the hand
- Begin with 3 minute sessions
- 10 minute sessions within 2 weeks
- Perform to patient’s tolerance

Carry

- Load extremity
- Arm, elbow, wrist extension
- Beginning weight usually between 1 to 5 pounds
- Carry weight throughout the day especially when standing
- Record daily weight and time carried
Therapeutic Activities to encourage FUNCTION
- Rolling BALL
- PEGS
- TherapyZone MARV –
- Picking up objects
- Making something
- Successful completion of exercises

Conditioning In GENERAL
- incorporate the entire UE -- prevent stiffness and try to minimize spreading

Using the whole upper extremity
- UBE
- Pulleys
- BTE
- Ball on mat table
- Wall walking
- Cone stacking
- Cane exercises
- Skate-board for shoulder and elbow

- Rolling the ball and using the ball
- Wand/stick exercises
- Light pick up
- Powerweb and other modalities
  - Finger exercises
  - Sand

Splinting
- General rule – Do not immobilize unless ABSOLUTELY necessary

Reasons for Static Splinting
- Protection
- Positional
- Pain maintenance
  - CAUTION must be employed when including static splinting in plan of care
  - Extensive education must be conveyed to the patient in regards to wasting
Safe position at night may be helpful if person is showing signs of contractures

Safe position: 20 degrees wrist extension, palmar abduction of the thumb, 70 degrees of MP flexion, and IP’s at 0 – 10 degrees

Night-time only

Wrist support – good when patient has trouble with supporting the wrist

- Demo

Neoprene Splinting

- Excellent adjunct for treatment
- Provides warmth
- Increases blood flow
- Provides minimal support/compression
- Ability to move while wearing splint
- Provide psychological benefits
- Decreases chance of wasting vs. hard splint
Thoughts on Static Splinting

- Avoid starting with splints if it can be avoided.

Static Progressive Splinting - goals

- Mobilization
  - Reversal of contracture

Static Progressive

- Pros
  - Short Duration
  - Patient Control
  - Positional control

- Cons
  - Cumbersome
  - Patient’s may get too aggressive with increasing tension
  - Patient’s may not increase according to recommendations

Dynamic Splinting

- Goal
  - Increase ROM
  - Decrease contractures
  - Decrease pain – will often occur via stimulation of large diameter afferent fibers
  - Increase Function
  - Improve positional use
Negatives of Dynamic Splinting

- Technical requires prolonged wearing time (8 to 10+ hours) – therefore I would use intermittently throughout the day or at night (30 minutes to an hr each time during the day)
  - Night wear usually causes sleep disturbances
  - Day wear limits functional integration of the symptomatic extremity

Tex Taping

4 Essential Functions of Tex Tape

- Muscle function
- Lymphatic function
- Pain management function
- Joint function

General Benefits of Tex Tape

- Relatively economical
- Easy to apply
- Fewer types of tape needed (no layering)
- Applied for longer period of time
  (application generally lasts 3-4 days, 4-6 days for dry skin)

EHT's Tex Taping of the Upper Extremity Course

Exploringhandtherapy.com
Or for direct orders go to:
Liveconferences.com
CPM

- Decreases stiffness
- Aligns Scar tissue
- Can be used in conjunction with TENS
- Use with Caution – PROM concerns

CPM

- Can be used intermittent throughout the day to limit interference with active use of extremity
- Night use
- Pain Free range of motion
- Contribute to pain relief via the gate theory and will also improve peri-articular and cartilage nutrition

Neural Tension

- According to Butler adverse neural tension may contribute to sympathetic activity in the body
- Neural treatments may be beneficial when treating these cases
- Avoid flaring the patient with aggressive tensioning on the nerve

Neural Tension Approach

- Pt. can do self nerve glides
- You can perform neural tension glides in a gentle fashion
- Remember hurt is o.k but harm in not
- (Dr. Kirkpatrick)

Less Traditional Intervention

- Acupuncture
- Meditation
- Spiritual
- Nutritional
Acupuncture
- Discussed in literature
- May help
- Can’t hurt
- Most believe anything that may help is worth trying

Meditation
- Meditation
- Relaxation techniques
  - Progressive relaxation
- Guided Imagery
  - A technique that teaches you relaxation methods

Nutrition
- Avoid carbohydrates
- Avoid caffeine
  - Iced tea seems to be the mildest and safest of caffeinated drinks.
  - Coffee is more harmful than caffeinated soft drinks or tea
- Avoid red meats
- Avoid sugars

Neurological Associates Four F’s Diet
H. Hooshmand, M.D.
From: Chronic Pain: Reflex Sympathetic Dystrophy Prevention and Management
CRC Press, Boca Raton, Florida.

The four F’s:
1. Fresh Fruit - not canned.
2. Fresh vegetables - Olive oil is the best cooking oil.
3. Fish - baked or broiled. Use fresh lemon juice for flavor. Avoid the use of margarine.
4. Fowl - skinned! Not fried - baked, roasted or grilled is fine. When you are in a hurry, try wrapping a boneless breast with vegetables (i.e., onions and bell peppers) in aluminum foil and baking - it is quick and easy.

Avoid the five C’s: cookies, cake, chocolate, cocktails, and candy
### Sleep
- Sleep is critical
- Get person comfortable for sleep
- Avoid interrupting sleep if possible

### Diaphragmatic Breathing
- Better blood flow and oxygenation in the system
- Demo
- Relaxation technique
- Increase water uptake as this will improve tissue hydration and oxygen saturation rates in peripheral tissues are effected by tissue hydration

### Spirituality
- Personal
- Encourage inner growth
- It may help with coping

### Use of Humor 😊

### Promoting Stress-free use of limbs
- Avoid static or awkward postures
  - Ergonomic counseling, joint protection, activity modification, energy conservation should be included in the overall treatment of the patient
- Progression of the disease – what to expect
- Positive thinking - CRITICAL
- Overall health and well-being
- Family or support
- Reading materials
ADL’s

- Focus on function
- Use of adaptive equipment if needed
- Using as a support arm
- Avoid using a sling
- Promote socialization
- Encourage leisure tasks or pick up new leisure skills

Crafts

- Will increase the patient’s confidence
- Patient is made aware that the hand is functional
- Reincorporates the spontaneous use of the injured hand

Return to work

- Early return is critical
- Light use of arm or no use in early stages
- Loss of self esteem when not working

RSD Awareness

- Estimated 1.5 million have RSD in the U.S.
- Although could be as many as 6 million
- This syndrome occurs after 1 to 2% of various fractures, after 2 to 5% of peripheral nerve injuries, and 7 to 35% of prospective studies of Colles fracture.
- Patients see an average of 4.8 physicians before referral to a pain center
- If diagnosed within 6 months of onset it is easier to treat than after 6 months

Thank You

Good Reference Websites

- http://www.rsfoundation.org
- http://www.rsd.org
- www.ampainsoc.org
- www.britishpainsociety.org