Evidence Based Management of Repetitive Strain Injuries

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What will be covered?

- Advances made in our Understanding of RSI since 2009.
- Overview of RECOUP’s Current RSI Treatment Protocol and the changes made since 2009.
- How is RECOUP’s treatment approach different?
Dr Deepak Sharan recently visited Holland and spoke at a meeting of the Dutch RSI Association. In discussing his treatment regime for RSI, he said that he could cure more than 95% of RSI cases even after many years of chronicity. In the May 2010 edition of the Dutch RSI Association magazine, Handvat, two Dutch experts on RSI commented on his talk.

The first was Dr Judith Sluiter from the Coronel Institute for Work and Health:

“Dr. Sharan has never published any studies. If you only look at your own population of patients, and you have no control group with which to compare them, then you are not getting objective data. Having treated some 55,000 patients, when is he going to publish something? Of course people say they have been cured – you go there for two months, you are well looked after, your complaints are taken seriously, and you get all kinds of treatment; one of them might work.

“Dr. Sharan is not offering one specific treatment – it's a scattergun approach. One of the treatments might be successful but you don't know which one. The reasons for his success lie in the bio-psycho-social approach he takes to tackle the problem, although that is also being done here in Holland in re-integration centres. He uses trigger point therapy aimed at specific neural points, which does have a short-term effect: It irritates and stimulates the trigger point and it can have a curative effect but with a number of people it doesn’t work. It would be a good thing if we could hear of an experience of one of his patients.”

The second comment was from Maaike Huysmans, a musculoskeletal therapist.

“The talks sounded like a free commercial. And what does his success rate mean? When do you get rid of the pain? How much pain? How much less pain do you have and how long does it last? “It calls forth all these questions which can't be answered for lack of objective research.”
Generalised muscle pain in Computer Users usually indicated “diffuse” or “non specific” RSI.

On developing pain one should stop using the hands and go off work till symptoms resolve.

Consultation with physicians should be avoided if possible since they know nothing about RSI.
RSI Knowledge in 2001

- Treatment was essentially home exercises picked up from books or web sites or routine Physiotherapy in severe cases.
- One should be guided largely by other RSI sufferers and information on the Internet or patient support groups.
- RSI could only be “managed” and not permanently cured, as long as the exposure (e.g., computer usage) persisted.
RSI Knowledge in 2009

- Generalised muscle pain in Computer Users often did not indicate RSI.
- On developing symptoms prolonged disuse and rest must be avoided to prevent CRPS.
- Proactively seek early, physician-led multidisciplinary treatment and avoid self treatment alone. Get expert hands to work on you.
RSI Knowledge in 2009

- Physiotherapy was just one piece of the jigsaw.
- One should be wary of opinions expressed by other laypersons and google judiciously.
- RSI cannot be “managed.”
- Complete recovery from RSI (i.e., return to full time work or activity) was the rule rather than the exception, if all the pieces of the jigsaw fell into place.
History: symptoms that get worse towards the end of the working day or week and get better with rest or time off work tend to be work related, at least in the earlier stages.
The physical assessment includes a comprehensive and methodical musculoskeletal examination with a focus on range of motion, myofascial trigger points (MTrPs), biomechanical or postural problems, and evidence of nerve or blood vessel entrapment, and any other pertinent tests according to the presentation e.g., Finkelstein’s, Roos, Mill’s.
A specific diagnosis consistent with the current International Classification of Diseases is necessary.

Terms such as repetitive strain injury, occupational overuse syndrome, repetitive motion disorders, and cumulative trauma disorders are not ICD diagnoses.

At RECOUP, every single RSI patient has received a specific diagnosis so far.
Investigations

- Bloods: CBC, Arthritis and Thyroid Profile
- X-ray (sometimes shows cervical ribs)
- Ultrasound Scan (esp. useful for shoulder tendinitis)
- MRI (beware false positives)
- Nerve Conduction Tests (not fool proof)
- Bone Densitometry: Osteoporosis is now a major concern even in young males
Upper extremity conditions

Specific conditions

Non-Specific conditions
(characterized by pain, discomfort, fatigue, limited movement, loss of muscle power without a pattern allowing a specific diagnosis to be made)

Other specific conditions
(relationship to a recognized risk factor on a case by case basis)

Recognized specific conditions

<table>
<thead>
<tr>
<th>Tendon-related disorders</th>
<th>Nerve-related disorders</th>
<th>Circulatory/vascular type disorders</th>
<th>Joint-related disorders</th>
<th>Pain syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexor-extensor peritendinitis/tenosynovitis of the forearm-wrist</td>
<td>Carpal tunnel syndrome</td>
<td>Raynaud’s phenomenon (vibration white finger) and peripheral neuropathy associated with Hand/arm vibration syndrome</td>
<td>Arthritis</td>
<td>Fibromyalgia</td>
</tr>
<tr>
<td>Epicondylitis</td>
<td>Cubital tunnel syndrome</td>
<td></td>
<td>Radiating neck complaints</td>
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<tr>
<td>De Quervain’s disease</td>
<td>Guyon canal syndrome</td>
<td></td>
<td>Shoulder capsulitis (frozen shoulder)</td>
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<tr>
<td>Rotator cuff syndrome</td>
<td>Radial tunnel syndrome</td>
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</table>
The rehabilitation team must be led by a Physician and not a Therapist or an Alternative Medicine Practitioner because over 30% of 100,000 RSI patients treated at RECOUP were found to have a co-morbid condition on investigation requiring medical management.
Common Comorbidities

- Nutritional Deficiencies, esp. anaemia, Low Vit D
- Hypothyroidism
- Hyperuricemia
- Inflammatory Arthritis
- Osteopenia and Osteoporosis
- Depression and other Psychiatric Disorders

If not identified before starting Physiotherapy some of these conditions can lead to major complications during therapy. These can also lead to persistence of the MSD unless treated.
Myofascial Pain Syndrome: Definition

Pain of a regional nature beginning within a specific trigger point within muscle/fascia

- Pain can refer

- Associated phenomena may include autonomic abnormalities: blanching, coldness, sweating, piloerection, erythema, hyperesthesia, and hyperalgesia locally or within the area of referred pain
- MEP: motor endplates
- CK: contraction knots
- MN: motor nerves
- SA: nociceptive and sensory afferents
Myofascia
Interfascial Connections

Rectus abdominus (abdominal fascia)

External oblique

Serratus anterior
Anatomy Trains

- The Superficial Back Line
- The Superficial Front Line
- The Lateral Line
- The Spiral Line
- The Arm Lines
- The Functional Lines
- The Deep Front Line
Simons Criteria for Dx of MPS

**Major criteria:**

1. Localised spontaneous pain.

2. Spontaneous pain or altered sensations in expected referred pain area for given MTrP

3. Taut, palpable band in accessible muscle.

4. Exquisite, localised tenderness in precise point along taut band

5. Some measurable reduced movement range.

5 major and at least 1 of 3 minor criteria
Simons Criteria for Dx of MPS

**Minor criteria:**

1. Reproduction of spontaneously perceived pain and altered sensations by pressure on MTrP.

2. Elicitation of local twitch response of muscular fibers by transverse “snapping” palpation or by needle insertion into MTrP.

3. Pain relief obtained by muscle stretching or injection of MTrP.

5 major and at least 1 of 3 minor criteria
Types of Trigger Points

- Active TrP and Latent TrP
- Key TrP and Satellite TrP
Active TrP’s

- Causes pain and tenderness at rest or with motion that stretches or loads the muscle.
- It prevents full lengthening of the muscle, as well as fatigue and decreased strength.
- Pressure on an active MTrP induces / reproduces some of the patient’s pain complaint and is recognised by the patient as being some or all of his or her pain.
- The signs and symptoms of TrP activity long outlast the precipitating event.
Latent TrP

- Clinically quiescent with respect to spontaneous pain, but painful when palpated.
- Does not cause pain during normal activities.
- It also refers pain on pressure.
- It can be associated with a weakened, shortened, more easily fatigued muscle.
- Responsible for activating one or more satellite TrP’s

- Develops almost directly in the centre of the muscle fibres, where the motor endplate innervates it at the neuromuscular junction
Satellite TrP

- Develops in the zone of the referred pain pattern of the Key TrP
Magnetic Resonance Elastography of Taut Band

Chevron-shaped wave propagation was recorded on finite element simulation of the wave fronts in taut band

MR elastography of taut band

- MPS
- Normal

After TrPs are located, an algometer (force gauge meter) can be applied manually over it to measure the minimum pressure that induces pain.
Simultaneous 2D grayscale and color variance imaging of upper trapezius muscle

Biochemical Study of TrPs

Subjects with active MTPs in the trapezius muscle have a biochemical milieu of selected inflammatory mediators, neuropeptides, cytokines, and catecholamines different from subjects with latent or absent MTPs in their trapezius.

These concentrations also differ quantitatively from a remote, uninvolved site in the gastrocnemius muscle.

Thoracic Outlet Syndrome

“TOS is a collection of syndromes brought about by abnormal compression of the neurovascular bundle by bony, ligamentous or muscular obstacles between the cervical spine and the lower border of the axilla”

Nerves pass between vertebrae and out to fingers.
MR Angiography for TOS
Double Crush Syndrome

- Nerves are irritated and/or entrapped at a proximal location like the neck or thoracic outlet, as well as a distal location like the wrist.

- First described by Upton and McComas and published in Lancet in 1973. They found in 81/115 cases of carpal tunnel syndrome that there was an associated cervical radiculopathic finding as well.

- Naralcas reported that the proximal neuropathy usually preceded the distal one.
Is the Disorder Work Related?

- An EWA demonstrates that the affected joint(s) are functionally active in the patient’s occupation.

- Ergonomic job assessment indicates that affected joints are overloaded or subject to other significant risks such as static or translational stress.

- The occupational history and workplace ergonomic assessment indicate that biomechanical exposures are greater than those that would normally occur.
Is the Disorder Work Related?

- The occupational history shows sufficient exposure time for the disease to develop.
- There is an unusual pathologic pattern of joint injury that can be related to functional job tasks or particularly severe asymmetric localised disease correlated with ergonomic stresses.
- Unusual events, e.g., new tool/task, overtime.

- Bone mineral density was measured among 426 IT Professionals aged between 20 and 40 years (75% males).

- 10.7% subjects were exposed to the risk factors of osteoporosis: the commonest being lack of weight bearing exercise (52%), lack of exposure to sunlight (47%), consumption of caffeine/alcohol (47%) and associated joint pain (37%).

- Prevalence rate of osteopenia was 33.5% and of osteoporosis was 11.6%.
We have found a previously unreported association between Multidirectional Instability of Shoulders and Thoracic Outlet Syndrome in > 1000 patients.

Significance of generalised ligamentous hyperlaxity in RSI of other body regions.
Association of CRPS with undertreated TOS

- 26 patients
- All the patients were working in IT companies, and 20 were from Europe
- Median age 30±5.52
- Male=19, Female=7
- On initial presentation, 20 were not working and 6 were working less than 4 hours per day.

World Congress of Pain, Milan, 2012
Association of CRPS with undertreated TOS

All the patients reported the following symptom patterns:

- **Initial symptoms:** neck and upper back pain, upper extremity pain and numbness.

- **Later symptoms:** pain in all 4 quadrants, burning sensation, tingling, allodynia, hyperesthesia, swelling, decreased ROM.

- **Mean duration between the 2 stages:** 6 months (range 3-12 months).
The mean duration of the treatment was 3.54±0.647 months.

VAS showed a mean pre intervention value of 7.81±0.981 and post intervention value of 1.81±0.895.

SF36 showed a mean pre value of 26 (physical health= 25 and mental health=33) and post value of 74 (physical health= 74 and mental health=66).
Association of CRPS with undertreated TOS

- At a median follow up of 1 year, 21 patients reported that they had returned to full-time (> 8 hours) computer dependent work and previous activity level without any significant persisting symptoms, 4 patients reported that they were working part time (less than 4 hours per day) using a computer and 1 reported no improvement and 1 reported worsening of symptoms leading to loss of job.
Association of CRPS with undertreated TOS

- Associated co-morbidities were Multidirectional Shoulder Instability (21), Fibromyalgia (18), Hypermobile joints (18), Osteopenia (12) Depression and Psychological Abnormalities (11) and Osteoporosis (2).

- This study emphasises the importance of early identification and effective treatment of TOS to prevent disabling complications like CRPS. Once established, intensive, multi-disciplinary rehabilitation usually produces satisfactory functional outcomes.
Patients who presented for treatment within 6 months of onset of symptoms had complete recoveries.

The factors associated with poorer outcomes included presence of depression and psychological disorders, low socioeconomic status, presence of other medical co-morbidities and prolonged time off work.
'Workstyle', or how a worker behaviourally, cognitively and physiologically responds to increased or stressful work demands, has been proposed to help explain the link between ergonomic and psychosocial factors in WRMSD.
This model is based upon the hypothesis that *how an* individual performs his/her work tasks in reaction to increased work demands may either increase the likelihood of developing WRUES/Ds or exacerbate and maintain preexisting symptoms.
The short form workstyle questionnaire score analysis indicated 22% of overall participants (4500) were at a high risk (score ≥ 28) of adverse workstyle.

63% of participants reported pain and discomfort during or shortly after they finished work on the computer.

34% of participants experienced numbness/tingling sensation in their fingers after working on the computer.
- Loss of strength in hands was reported by 33% of participants.
- 13% of participants indicated a loss in productivity due to the symptoms of pain and discomfort.
- Less than 1% of participants indicated that days were taken off work due to the pain symptoms.
Correlation analyses revealed that pain was significantly correlated with the total workstyle score \( (r = 0.39, p = 0.001) \), social reactivity subscale \( (r = 0.29, p = 0.004) \) and breaks \( (r = 0.22, p = 0.005) \) subscale.

Pain was also significantly correlated with loss of productivity \( (r = 0.32, p = 0.001) \), duration of computer use per day \( (r = 0.28, p = 0.005) \), loss of hand strength \( (r = 0.45, p = 0.000) \), and gender \( (r = 0.18, p = 0.002) \).
Results

Study findings indicated that the following subscales of the workstyle questionnaire were significantly correlated with pain and loss of productivity:

1. Social reactivity
2. Lack of breaks, and
3. Deadlines/pressure.
Risk factors, clinical features and outcome of treatment of work related musculoskeletal disorders in on-site clinics among IT companies in India

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<table>
<thead>
<tr>
<th>Clinical Features</th>
<th>Number (n=5111)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>4909</td>
<td>92%</td>
</tr>
<tr>
<td>Numbness, burning or tingling of the hand</td>
<td>1387</td>
<td>26%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>1350</td>
<td>25%</td>
</tr>
<tr>
<td>Sleeplessness</td>
<td>1347</td>
<td>25%</td>
</tr>
<tr>
<td>Eye strain</td>
<td>1247</td>
<td>23%</td>
</tr>
<tr>
<td>Weakness</td>
<td>847</td>
<td>16%</td>
</tr>
<tr>
<td>Stiffness of neck and shoulder</td>
<td>563</td>
<td>11%</td>
</tr>
<tr>
<td>Loss of grip and strength</td>
<td>495</td>
<td>9%</td>
</tr>
<tr>
<td>Clumsiness of hand</td>
<td>380</td>
<td>7%</td>
</tr>
<tr>
<td>Catching and snapping of the movement</td>
<td>161</td>
<td>3%</td>
</tr>
<tr>
<td>Headache</td>
<td>155</td>
<td>3%</td>
</tr>
<tr>
<td>Swelling</td>
<td>107</td>
<td>2%</td>
</tr>
<tr>
<td>Skin discoloration</td>
<td>15</td>
<td>0.3%</td>
</tr>
<tr>
<td>Temperature changes</td>
<td>17</td>
<td>0.3%</td>
</tr>
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</table>
Regional Pain Distribution
Results

- Myofascial Pain Syndrome (46%) was the commonest diagnosis, followed by Thoracic Outlet Syndrome (29%), Fibromyalgia (15%), Wrist Tendinitis (5%), Cubital Tunnel Syndrome (0.30%), and Chronic Regional Pain Syndrome (0.43%).

- 95% of employees recovered completely, while 5% recovered partially and still had mild discomfort and pain.
Return on Investment of an On-site Employee Health Clinic in Multinational Information Technology Company in India

➢ Special Session at World Ergonomic Congress in Feb 2012 at Recife, Brazil
Before the intervention, the company had complaints from the employees of pain and discomfort and demands for better furniture.

The companies invested in so-called Ergonomic chairs, ranging from Indian Rupee (INR) 2000 to 20,000 (USD 40 to 400) but the problems still remained.

For this case study, we evaluated 150 employees, those who had complaints of pain and discomfort while working and reported that their productivity was affected due to the pain.
Our total cost of intervention includes nominal wages (INR 15,000/month or USD 300/month) to our Therapists/Ergonomists for performing the assessment and treatment plus in some cases addition of accessories (keyboard tray, mouse tray, laptop stands) but in majority of these cases success was achieved by just adjusting the existing components of the workstation.
Our therapists spent 4 hour/day on the premises of the company to provide on-site training and treatment of employee complaints.
The benefits include reduced complaints of pain and discomfort leading to an increase in productivity and a decrease in absenteeism among employees.

After completing the on-site programme, we collected self-reports from the employees regarding their productivity and level of pain.

95% of employees reported no pain and that their productivity had significantly increased.
Table 1. Comparison of pain intensity before and after the intervention

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
<th>t-value</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.89 (±1.10)</td>
<td>3.37 (±1.42)</td>
<td>13.11</td>
<td>P&lt;0.05</td>
</tr>
</tbody>
</table>
Therefore, for 150 employees (approx. wages INR 180/hr (or USD 3.6/hr), working for 9hr/day) with an investment of one therapist employed, the productivity increased by an estimate of 20% based on employee feedback.

With these data, an approximate amount of INR 25,000 (USD 500) per worker per annum was saved by the company because of the on-site clinic intervention.
Advantages of an On Site Programme

- Convenience of employees, saving time and greater compliance
- Promoting earlier reporting of symptoms and hence a quicker and complete recovery
- Better follow up regarding recovery, work modifications and return to work
- Identification of personal medical risk factors

Advantages of an On Site Programme

- Allows on-site workstation assessment and modifications
- Maintenance of recovery by monitoring posture, breaks and exercises
- More effective coordination with members of Human Resources, Facilities and Health and Safety team
- Improved awareness levels regarding Ergonomics among Management and Employees
Advantages of an On Site Programme

- Most companies reported that, after starting the ergonomics programme, their costs related to purchase of expensive ergonomics gadgetry and special chairs “prescribed” by external doctors and physiotherapists who had no knowledge of the relevant workplace risk factors had actually reduced dramatically, with some companies reporting absolutely no new chair purchases in the year, except to replace damaged ones.

The aim of this study was to evaluate risk factors and clinical features of MSD due to hand held devices.
Methodology

- 27 adults and one child (21 males and 7 females) between 15–50 years old were recruited from a completed retrospective experimental study.

- They were examined, diagnosed and treated in tertiary level rehabilitation clinic. The subjects with symptoms were all clinically examined according to a published protocol by a physician.

- After the diagnosis and assessment, all the patients underwent rehabilitation using a sequenced protocol.
## Type of cell phone used

<table>
<thead>
<tr>
<th>Type of Mobile Phone</th>
<th>Numbers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackberry</td>
<td>22</td>
<td>78.6%</td>
</tr>
<tr>
<td>Other Smartphones</td>
<td>6</td>
<td>21.4%</td>
</tr>
</tbody>
</table>
67% of the blackberry users with Text Message Injury of the present study were primary level managers.

19% were top level CEO’s of major multinational companies in India.
Common Symptoms

1. Pain in the thumb and forearm with associated burning,
2. Numbness and tingling around the thenar aspect of the hand,
3. Stiffness of wrist and hand.
## Affected Body Sides

<table>
<thead>
<tr>
<th>Body sides affected</th>
<th>Numbers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right side</td>
<td>23</td>
<td>82.14%</td>
</tr>
<tr>
<td>Left side</td>
<td>1</td>
<td>3.57%</td>
</tr>
<tr>
<td>Both</td>
<td>2</td>
<td>7.14%</td>
</tr>
</tbody>
</table>
Tendinitis in extensor pollicis longus.
Myofascial Pain Syndrome of adductor pollicis, 1\textsuperscript{st} interossei and extensor digitorum communis.
Associated Problems

- Thoracic outlet syndrome (51.85%),
- Fibromyalgia syndrome (25.93%),
- Hypothyroidism (7.41%),
- Wrist tendinitis (14.81%) and
- De Quervain’s Tenosynovitis (7.41%)
Outcome

- All the subjects recovered completely following the rehabilitation.
- Mobile phones that promote the predominant usage of thumb while texting are associated with a higher prevalence of MSDs and users are advised to select phones that are designed to permit typing with all the fingers.
- Touch screen phones are preferred.
Prolonged rest, non usage of affected body part and usage of wrist splints can be dangerous and career threatening.

Symptoms will overpower workers from time to time and the situation will inevitably spiral downwards, unless a concerted attempt is made towards an early “cure.”
It is almost impossible to “manage” severe or chronic RSI

- At least 400 IT/ITES/BPO Professionals aged 20-35 have lost their jobs since 2001 because of advanced, neglected or poorly managed RSI leading to disabling complications like Complex Regional Pain Syndrome (CRPS).

- There is no published association of the link of CRPS with poorly managed RSI, hence its awareness in medical circles is minimal.
Goals of RSI Treatment

- Reduce symptoms
- Prevent progression
- Promote healing
- Reduce impairment and disability
- Prevent future injury
Our search for a sequenced and an integrated RSI Treatment Protocol started in the year 2001.

Our treatment approach in the initial days largely utilised Physical Therapy alone.

Our therapists were trained by Suparna Damany (RSI Therapist and author from USA).
Our success rate with the predominantly Physical Therapy approach was approximately 60-70%.

Flare ups and incomplete recoveries were common in patients with CWP.

Our results improved to > 95% once we refined our treatment protocol and added the Mind Body Approaches and Multidisciplinary Rehabilitation.
SHARAN'S® Protocol for RSI

- Skilled
- Hands-on
- Approach for
- Release of myofascia,
- Articular,
- Neural and
- Soft-tissue mobilisation
Previous authors have documented a statistically significant relationship between the presence of TrP in upper trapezius muscle and cervical joint dysfunctions at C3 and C4 vertebrae.

There is clinical evidence showing that joint dysfunctions can induce TrP activity, and that TrP activity can aggravate corresponding joint dysfunction.
Why A Sequenced Protocol?

- Nerve tissues can contribute to the origin or perpetuation of TrPs.
- Decreased extensibility of the upper quadrant neural structures, as assessed by the median nerve tension test, was associated with decreased length of upper Trapezius muscle.

Before starting treatment, I make a specific diagnosis and outline the treatment goals for our rehabilitation team.

I also supervise the treatment and review patients at least once a week, occasionally modifying treatment or stopping the treatment for reassessment and further investigations if necessary.

I decide when a patient can go on to the subsequent stage of rehabilitation.
Phases of SHARAN'S® Protocol

Phase 1 - Severe discomfort (Reduce pain, Eliminate MTrP’s and spasm, Restore muscle flexibility)

Phase 2 - Moderate discomfort (Reduce nerve tension and establish normal blood flow, Correct joint dysfunction)

Phase 3 - Mild discomfort (Postural correction, Strengthen muscles so that they do not fall back on nerves and blood vessels again, Prepare for Return to Work)

Phase 4 - Maintenance phase (Improve strength and endurance)
Phase -1 Severe Discomfort

- Ischaemic compression, deep pressure soft tissue massage
- Myofascial Release Technique
- Muscle Energy Technique
- Positional Release Techniques
- Craniosacral Therapy
- Relaxation techniques / breathing exercises
- Aqua Therapy in a Swimming Pool
- Taping
- Interferential Therapy (IFT), Ultrasound, Laser
- Spray & Stretch and TrP needling injections
Useful for Resistant MTrPs or in patients who do not tolerate Ischaemic Compression well
Causes of persisting pain after 2-3 sessions

1. The key MTrP has not been correctly identified and treated
2. The diagnosis of MTrP pain is incorrect
3. There are factors causing persistence or recurrence of the treated MTrP and require a review by the Physician
Causes of persistent MTrPs

- Mechanical: Structural, Postural, Ergonomic
- Medical: Infectious diseases (Lyme disease, Candida albicans infections), Inflammatory disorders, Immunological/allergic, Nutritional disorders (vitamin B6, B12, D, iron insufficiency), Hormonal disorders (hypothyroidism, GH deficiency)
Shifting pain during treatment

- This is likely to be an apparent movement rather than actual movement of a specific MTrP and can occur as a result of treatment of a series of satellite MTrPs.

- If the key MTrP is identified and treated in the first instance, this apparent movement is less likely to occur.
Chronic Widespread Pain

Earlier called Diffuse, Nonspecific RSI

1. Myofascial Pain Syndrome
2. Fibromyalgia
3. Complex Regional Pain Syndrome
4. Inflammatory Arthritis
5. Osteopenia and Osteoporosis
Positioning

Deep Pressure Soft Tissue Friction Massage

Ishaemic Compression

MFR

Evaluate

Muscle Energy Technique

Positional Release Technique

Interferential Therapy (IFT), Ultrasound, Laser, Moist Heat / Cryotherapy

Stretching & Taping Technique

Home Exercise Programme
Myofascial Release

- A hands-on soft tissue technique that stretches the restricted fascia (the covering layer of muscles) in a sustained manner and helps in improving its flexibility.

- MFR is often done after deep soft tissue massage to release an MTrP.

- MFR is performed for a period of 90 – 120 seconds
Muscle Energy Technique (MET)

- MET are soft tissue manipulative methods in which the patient, on request, actively uses his/her muscles from a controlled position, in a specific direction, with a mild effort against a precise counterforce.

- Used to stretch chronic or subacute restricted, fibrotic, contracted soft tissue (fascia and muscle) or tissue hosting active MTrPs.
Positional Release Technique (PRT)

- PRT is accomplished by placing the involved tissue in an ideal position of comfort (POC)
- The purpose of POC is to reduce the irritability of the tender point
Postural Taping

Taping for Temporomandibular Disorders

Taping for Multidirectional Instability of Shoulder
Treatment of Neuropathic Pain

- Stress Loading - scrubbing and carrying.
- Sensory Desensitisation
  - progressive stimulation with very soft material to more textured fabrics / materials.
  - stimulation graded from light touch to deep pressure.
- Transcutaneous electrical nerve stimulation with movement.
Treatment of Neuropathic Pain

- Oedema control: elevation, lymphatic drainage, retrograde massage, elasticated garments.
- Constraint Induced Movement Therapy.
- Proprioceptive Neuromuscular Facilitation (Pick the mango – put it in the basket).
- Muscle reeducation: reintegration of large proximal muscles into upper extremity activities.
Phase -2 Moderate Discomfort

- Soft tissue, neural, articular (rib / clavicular / scapulo-thoracic) and/or spinal (Maitland, Mulligan) mobilisation
- Nerve and tendon glides
- Self-stretching exercises
- Yoga
- Alexander technique
- Feldenkrais – Awareness through movement
- EMG Biofeedback
Articular Mobilisation

In Case of Thoracic Outlet syndrome

- Glenohumeral
- Clavicular
- Scapulo thoracic
- Rib
Newer Additions to Treatment Protocol

- Osteopathic techniques: ligamentous articular strain, visceromyofascial release, lymphatic techniques, cranial osteopathy, etc.
EMG Biofeedback

- The electromyography (EMG) measures muscle tension by sensors placed on the skin over appropriate muscles.

- EMG feedback is used for general relaxation training and is useful for the treatment of tension headaches, pain reduction, and muscle spasms, and to strengthen muscles.
In several types of RSI there is stickiness and adhesions (scarring) between the affected tendons and nerve and surrounding fascia and other tissues.

Glides produce pressure changes and a relative displacement of the tendon or nerve in regard to its surrounding tissues due to controlled movement in the neighbouring joint.
Treatment of Habitual Deep Muscle Tension

- EMG Biofeedback
- Yoga
- Alexander Technique
The Role of Mind Body Methods

- In isolation, these methods help somewhat but are not usually curative, except in the milder cases.

- When used in a holistic, multidisciplinary manner, these methods are a powerful adjunct to the overall treatment.
I love your mind... but not your body.

THE MIND - BODY PROBLEM
We found AT to be a valuable “body awareness” adjunct and integrated it in our treatment protocol.

AT teachers from UK, USA, Australia, Finland, Germany, Ireland, France and Switzerland have since visited us.
We incorporated Yoga to address the “Mind Body” connection. We offer individualised Yoga through a Physician or Physiotherapist cum Yoga Teacher who are knowledgeable about RSI.
De Stressing Modalities

- Psychological counselling
- Stress management
- Cognitive Behavioural Therapy
- Mindfulness Training
- Sleep Hygiene
- Meditation
Phase – 3 Mild Discomfort

- Progressive strengthening exercises
- Further self-stretching exercises
- Postural retraining using EMG Biofeedback, body mechanics and ergonomics training on a model computer workstation
- Ergonomic furniture and accessory recommendation
Strengthening builds endurance, helps people maintain proper posture and relieve pressure on nerves and blood vessels.

However, strengthening is absolutely the last step of rehabilitation and when done in the presence of active MTrP’s, worsens the situation.

We start supervised strengthening usually a fortnight after the pain has subsided, and only when the MTrP’s have been treated, and adequate flexibility achieved.
Progressive Strengthening Exercises

- Free Hand
- Thera Band
- Weight Cuffs
- Gymnasium
- Avoid Dumbbells
Phase – 4 Maintenance Phase

- Further strength training
- Aerobic conditioning
- Yoga
- Alexander Technique
- Feldenkrais
- Tai Chi
Jamar Dynamometer
Significance of SHARANS Protocol

- Comprehensive, multidisciplinary, holistic approach.
- Tailored towards specific MSD’s.
- Excellent documented and published clinical results.
Effectiveness of a new sequenced multi-disciplinary rehabilitation protocol for Thoracic Outlet Syndrome in Indian computer professionals.

100 computer professionals with TOS treated with SHARAN’s Protocol for 4 weeks.

Symptoms: pain (76%), numbness (69%), weakness (67%), paraesthesia (62%).

Follow up at 2 weeks and 4 weeks.
➢ There was a significant reduction in pain based on VAS measurement (before intervention 7.01 +/- 1.28, after 4 weeks of intervention, 2.19 +/- 1.18).

➢ There was also a significant reduction in the major MTrPs in upper trapezius, scelanae, rhomboids and pectoralis on Pressure Algometry (Wagener).

➢ There was an increase of ROM in cervical spine, especially lateral flexion and rotations.
Neck Disability Index also showed a significant improvement, before intervention 45.38 +/- 6.09, after 4 week intervention 18.58+/-5.51.

The described, sequential, multidisciplinary rehabilitation protocol was uniformly successful in relieving symptoms and restoring computer professionals with TOS to their previous function and work intensity.
The effect of Cetylated Fatty Esters and Physical Therapy on Myofascial Pain Syndrome of the Neck


The effect of cetylated fatty esters and physical therapy on myofascial pain syndrome of the neck

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To find out the effects of CFEC topical treatment with SHARANS Protocol on patients with MPS of the neck.
Responses were compared to baseline (5 weeks treatment; 3 assessment visits) for following:

- Therapist work-up
- Palpation tenderness
- TrP algometer readings (*Wagner*)
- Cervical Range of Motion (CROM®)
- Participant response evaluations: Neck Pain & Disability Visual Analogue Scale (NPDVAS), Neck Disability Index (NDI), and 36-item short-form health survey (SF36)
## RESULTS

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Measure</th>
<th>Visit (week)</th>
<th>Efficacy assessment*</th>
<th>Significance between groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>CF-PT</td>
<td>PL-PT</td>
</tr>
<tr>
<td>Neck disability</td>
<td>NDI</td>
<td>0</td>
<td>38.4±11.7</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>27.4±6.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>18.8±7.8</td>
<td>&lt;0.001</td>
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<tr>
<td>Neck pain</td>
<td>NPD-VAS</td>
<td>0</td>
<td>46.3±10.2</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>34.8±7.4</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>25.3±10.4</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Results

Treatment effects on total cervical range of motion. A positive change indicates a more favorable result. V1Zbaseline visit; V2Zweek 2 Visit; V3Zweek 4 visit.

Changes in the composite SF36 QOL index with treatment. A positive change indicates a more favorable result. V1Zbaseline visit; V2Zweek 2 Visit; V3Zweek 4 visit.
Factors Determining RTW

- Type of MSD condition
- Severity of the MSD condition
  (DEEPAK SHARAN’S Severity Score)
- MSD risk factors present on the job
Development of a score for assessing severity, predicting interventions and prognosis of musculoskeletal disorders

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Abstract. Musculoskeletal disorders (MSD’s) are a constellation of disorders. There is no single tool available which guides the clinicians to predict the severity, intervention and recovery period of the patients who is suffering from different musculoskeletal disorder. In this paper authors tried to categorize the severity of the musculoskeletal discomfort and the prognosis of the recovery period. The questionnaire was formulated using different epidemiological risk factor of the development of MSD and the effect of MSD on physical and psychosocial factors. The questionnaire contains 13 questions which include seven direct (rating was 0, 2, 4, 6, 8 and 10) and six indirect (rating was 0, 1, 2, 3, 4 and 5) questions. Results revealed a significant correlation with the prognosis of recovery and the actual recovery period (r= 0.80). It also showed a significant correlation between the total severity score and the actual recovery (r=0.82) period. Depending on the prognosis of the recovery the severity score was segregated in four categories as mild, moderate, severe and complicated. Due to small sample size the prognosis of recovery for higher severity score could not be plotted.

Key words: “DEEPAK SHARANS”; “Outcome”; “Validity”
Objective of the study

This study aimed at to develop a score, incorporating all the factors associated with the development of MSD, which can be used as a prediction tool for identifying the severity, prognosis and probable treatment of musculoskeletal disorders.
Based on our experience of successfully assessing and treating over 100,000 patients with WRMSD (2001-2010).

We meticulously identified the factors determining the severity and prognosis of WRMSD in our clinical experience.
Development of the tool

➢ “DEEPAK SHARAN’S” Musculoskeletal Disorder Severity Score

➢ Acronym of first letters of the factors affecting the severity and prognosis
- **Duration of symptoms**
- **Effect on activities of daily living (ADL)**
- **Exertion level (use of physical energy/hard work) during work**
- **Pain intensity**
- **Ability to maintain speed of work**
- **Known physical health issue**
- **Stress**
- **Hours of continuous work per day (at office or doing chores at home)**
- **Area affected**
- **Restricted movements of affected area**
- **Activity restriction during work (at office or at home)**
- **Nerve related symptoms**
- **Sleep disturbance due to pain**
It contains six statements in each of thirteen sections.

Direct and indirect sections according to the involvement of severity. Scoring of statements in direct section is 2, 4, 6, 8 & 10 and indirect section is 1, 2, 3, 4 & 5.

Only one statement can be ticked under each section. If more than one response is valid under a given section tick the one with the highest score.

Total score can range from 0 to 100.
Steps of Development

1. 13 factors identified from literature and practical experience.
2. Magnitude of the factors established using available literature and practical experience.
3. According to the magnitude, the scoring system was developed.
4. Expert’s validation was performed using ‘Delphi’ method.
5. Preliminary validity study was performed on a small sample.
6. Grading was calculated using statistical method.
Sample size – 60

Symptoms recorded – all musculoskeletal disorders

Inclusion criteria

– Below 45 years
– Above 20 years
– Without any acute injury
The questionnaire was filled by the subject before physician’s examination.

Physician was blinded about the score of the questionnaire.

The severity score were calculated.

The prescription of the physician was noted separately.
Methodology

- Prediction of the recovery was noted separately by the experts depending on the severity score and physician’s diagnosis.
- The treatment started according to the prescription given by the physician.
- Recovery of the patient were noted periodically and complete recovery period calculated.
Correlation analysis was computed using raw data.

The actual recovery and predicted recovery were plotted against total severity score.

Further direct and indirect score were also plotted against total severity score and recovery period (actual and predicted).
Result

- Mean age of the subjects: 41.5 ± 13.4 years
- Type of MSD evaluated during the validation study were
  - Low back pain
  - Neck pain
  - Lower limb pain
  - Shoulder and wrist pain
  - Etiology was usually Myofascial pain at various body parts.
<table>
<thead>
<tr>
<th></th>
<th>Total Score</th>
<th>Direct Score</th>
<th>Indirect Score</th>
<th>Predicted Recovery</th>
<th>Actual Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Score</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Score</td>
<td>0.78**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect Score</td>
<td>0.54**</td>
<td>0.38*</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predicted Recovery</td>
<td>0.69**</td>
<td>0.72**</td>
<td>0.22*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Actual Recovery</td>
<td>0.66**</td>
<td>0.70**</td>
<td>0.18</td>
<td>0.95**</td>
<td>1</td>
</tr>
</tbody>
</table>

** - p<0.001, * - p<0.05
The graph is derived from regression analysis.
The graph is derived from regression analysis.
<table>
<thead>
<tr>
<th>Severity</th>
<th>Severity Score</th>
<th>Predicted recovery period</th>
<th>Actual recovery period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1:Mild</td>
<td>&lt;40</td>
<td>1 – 3 weeks</td>
<td>1 – 3 weeks</td>
</tr>
<tr>
<td>Stage 2:Moderate</td>
<td>40 – 60</td>
<td>3 – 6 weeks</td>
<td>3 – 6 weeks</td>
</tr>
<tr>
<td>Stage 3:Severe</td>
<td>60 – 80</td>
<td>8 – 9 weeks</td>
<td>8 – 9 weeks</td>
</tr>
<tr>
<td>Stage 4:</td>
<td>≥80</td>
<td>≥ 6 months</td>
<td>≥ 6 months</td>
</tr>
</tbody>
</table>

The range arrived at from the statistical result and clinical experience
Conclusion

- DEEPAK SHARAN’s severity score is a comprehensive and valid assessment tool to determine the severity, prognosis of recovery and to suggest the appropriate intervention for MSDs.
How is RECOUP’s approach different?
How is RECOUP’s approach different?

- Clinical experience of the professionals.
- Multidisciplinary team and employment patterns.
- Professional independence and high motivation levels of professionals.
- Physician directed treatment.
- Intensive, cost-effective treatment under a single roof.
Patient centric

Comprehensive

Team work

Focus on Functional Restoration

RECOUP’s Approach
How is RECOUP’s approach different?

- Holistic approach based on the Biopsychosocial Model: Identification and correction of all predisposing factors, e.g., posture, stress, habitual deep muscle tension, medical co-morbidities.
- Mastery of Myofascial Pain, Fibromyalgia and Neuropathic Pain.
- R&D and ongoing hand on training of professionals.
10 Years of RECOUP!
Future Projects

- 20-30 more papers within a year.
- RSI Book.
- SHARAN’S (Safety & Health Assessment and Risk Analysis for a Neutralised Work Situation) Model for Ergonomic Workplace Analysis.
- Much better accommodation facilities: a new guest house adjacent to the RECOUP Hospital within a month.
Newer risk factors identified, e.g., low BMD, Hypovitaminosis D, hypermobility of joints.

Prognosis of RSI can now be judged more accurately.

Individual factors, e.g., Workstyle, Habitual Deep Muscle Tension, medical comorbidities must be addressed for a lasting recovery.

The age of onset of RSI has reduced and hand held devices are adding to the problem.
Best outcomes are seen when medical management is started early, and preferably at the workplace itself.

On site RSI Clinics offer excellent ROI.
Thank You

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