

Acupuncture Treatment in Spinal Cord Injury

**Ben — Quadriplegia
Debbie — Paraplegia**

I. General Consideration

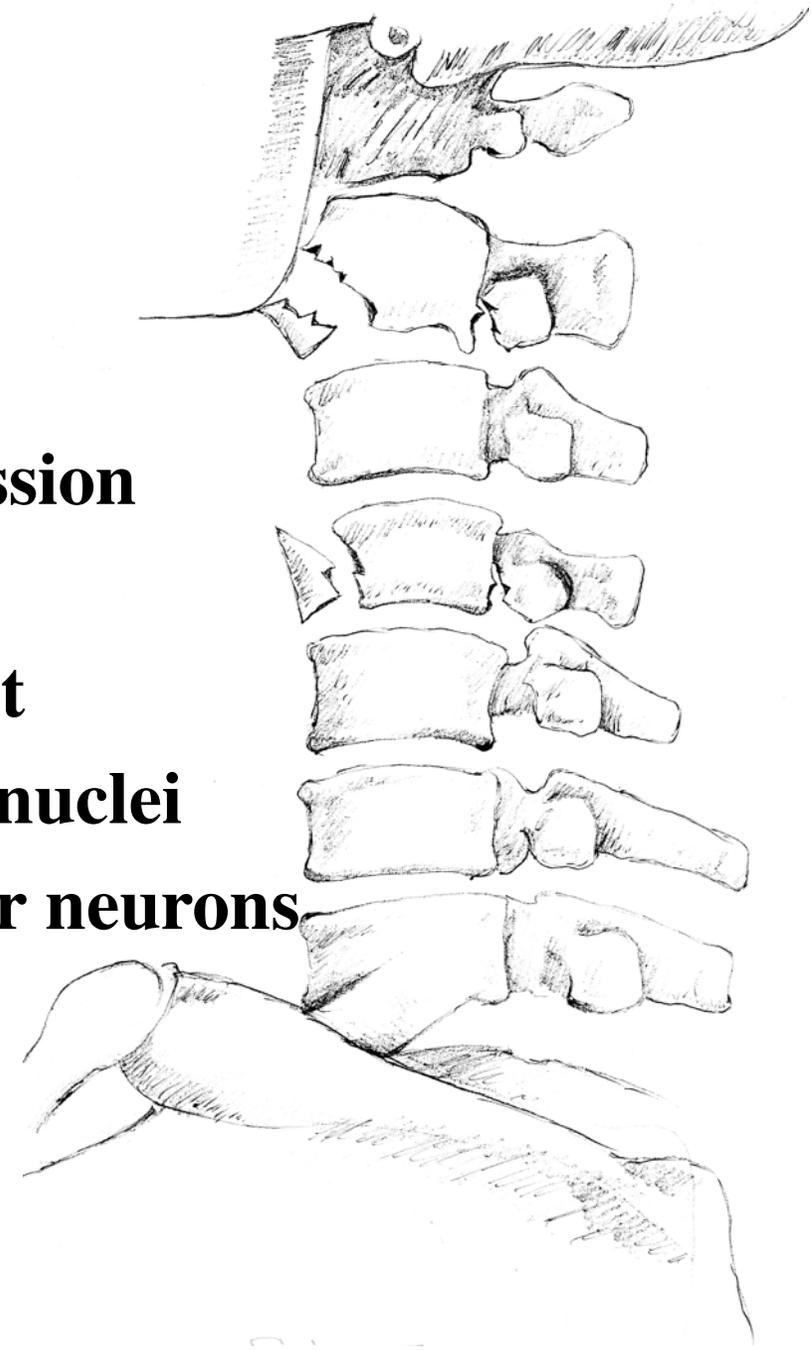
1. spine trauma—Spinal cord injury

- Vertebrae fracture, dislocation or/and compression
- Quadriplegia, paraplegia
- Loss of skin sensation or/and muscle movement

2. Case out-line of Ben: lesions to motor central nuclei

Case out-line of Debbie: lesions to lower motor neurons

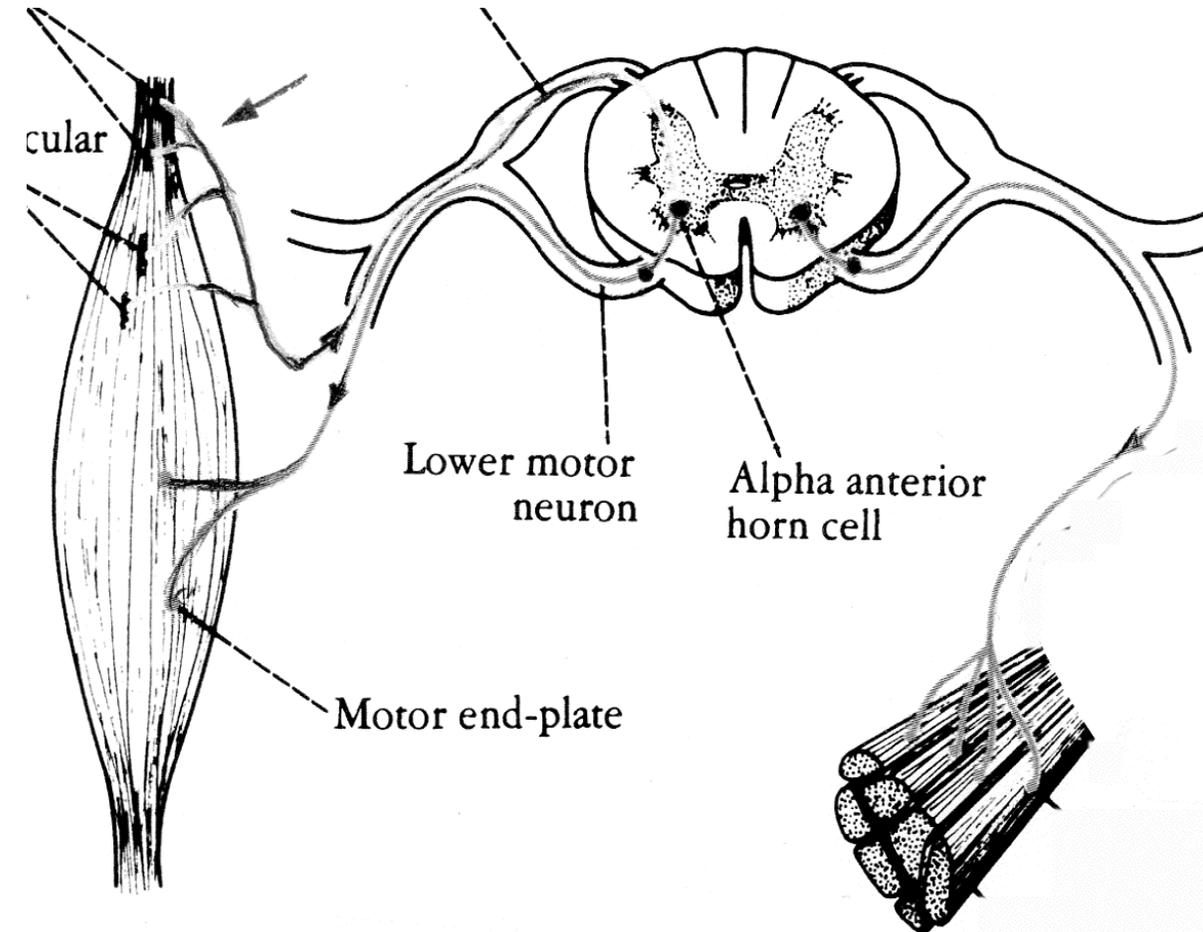
Picture: 1 SCI-Cervical vertebrae fracture



II. Three Main Effects in this ACU Treatment Approach to SCI

1. The needle is applied as a stimulator:

- Sensory neurons
- Neural path—reflex mechanism
- Motor neurons



II. Three Main Effects in this ACU Treatment Approach to SCI

2. Activate wound healing potential: ‘Cellular wound healing’

1-1 Macrophages

1-2 White blood cells

1-3 Skin regeneration, periosteum/bone stem cells

**** Mother and Son law—blood nourishes the son and the son moves the blood flow**

**** ‘Fire burning the mountain’—Pure reinforcement needle techniques**

II. Three Main Effects in this ACU Treatment Approach to SCI

3. The needle is used as a scalpel:

1-1 Releases obstruction in neurovascular pathway

1-2 Corrects malformation

1-3 Removal of degenerative proliferation tissues

**** ‘Releases the obstructive tissues’**

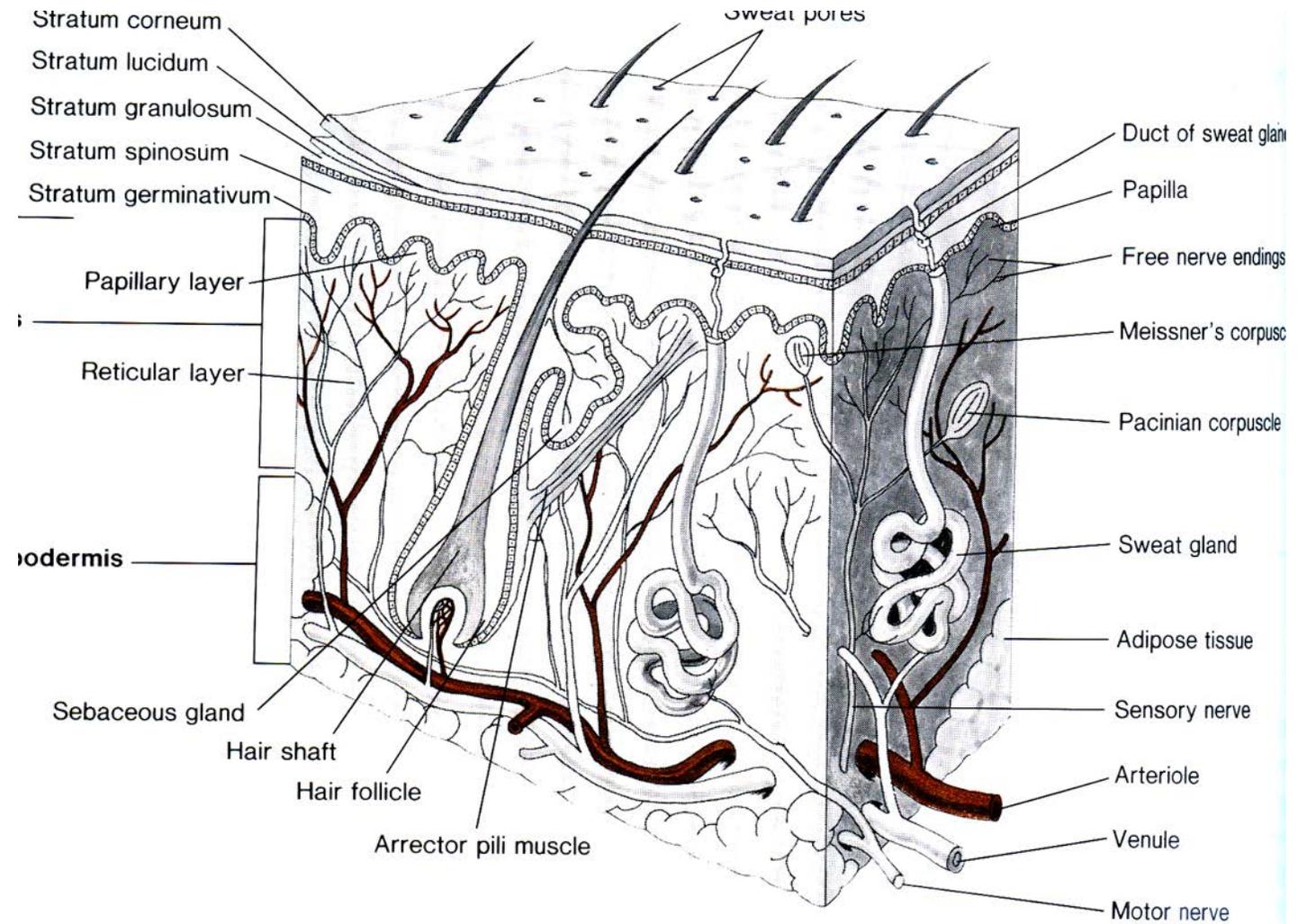
III. Needle Techniques

1. Skin: Regeneration, receptors

- free nerve ending

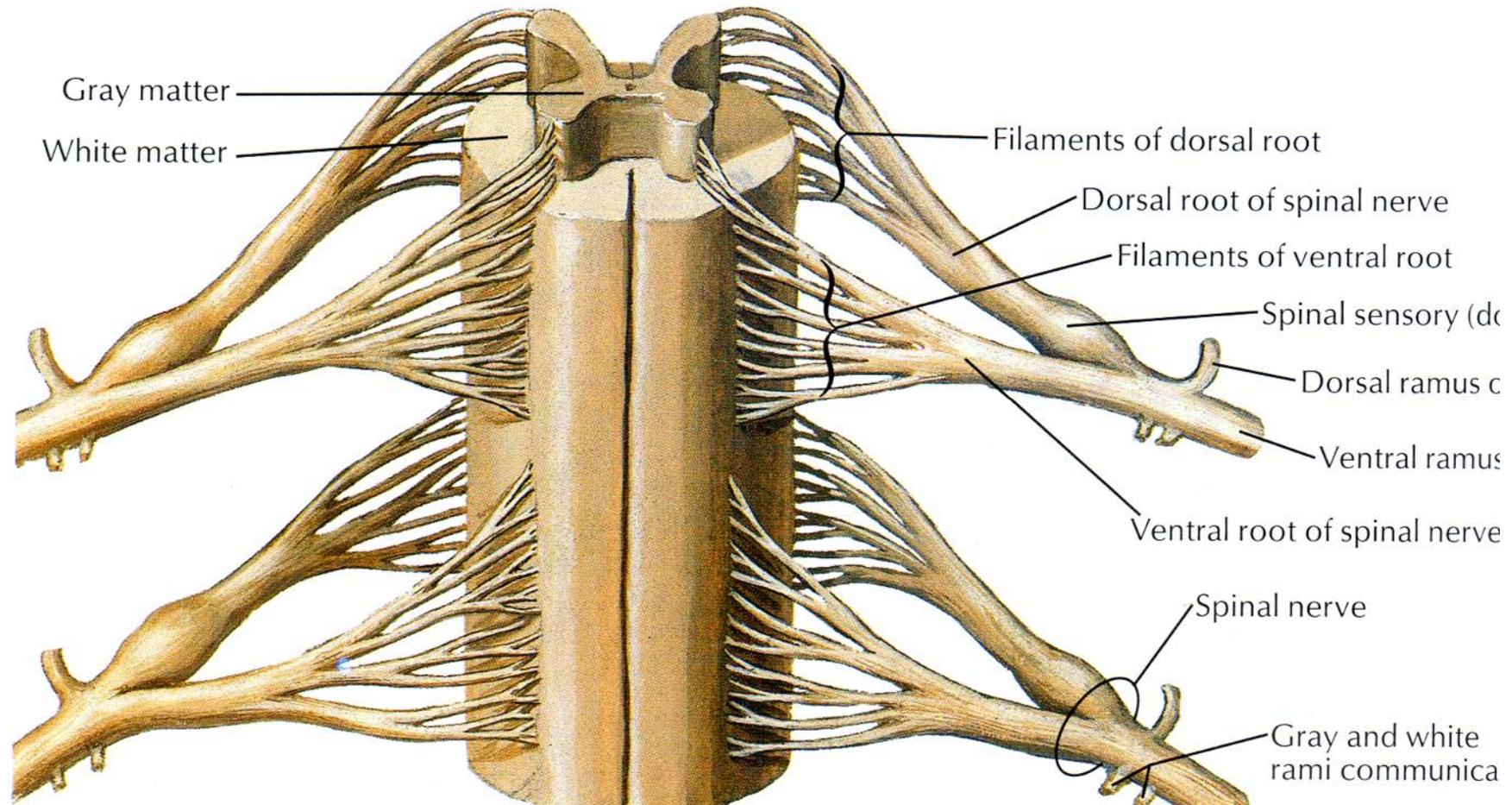
Reticular layer

- stretching power



Spinal nerves—dorsal root ganglia [sensory neurons]

Ventral root—mixes nerve [motor neurons]



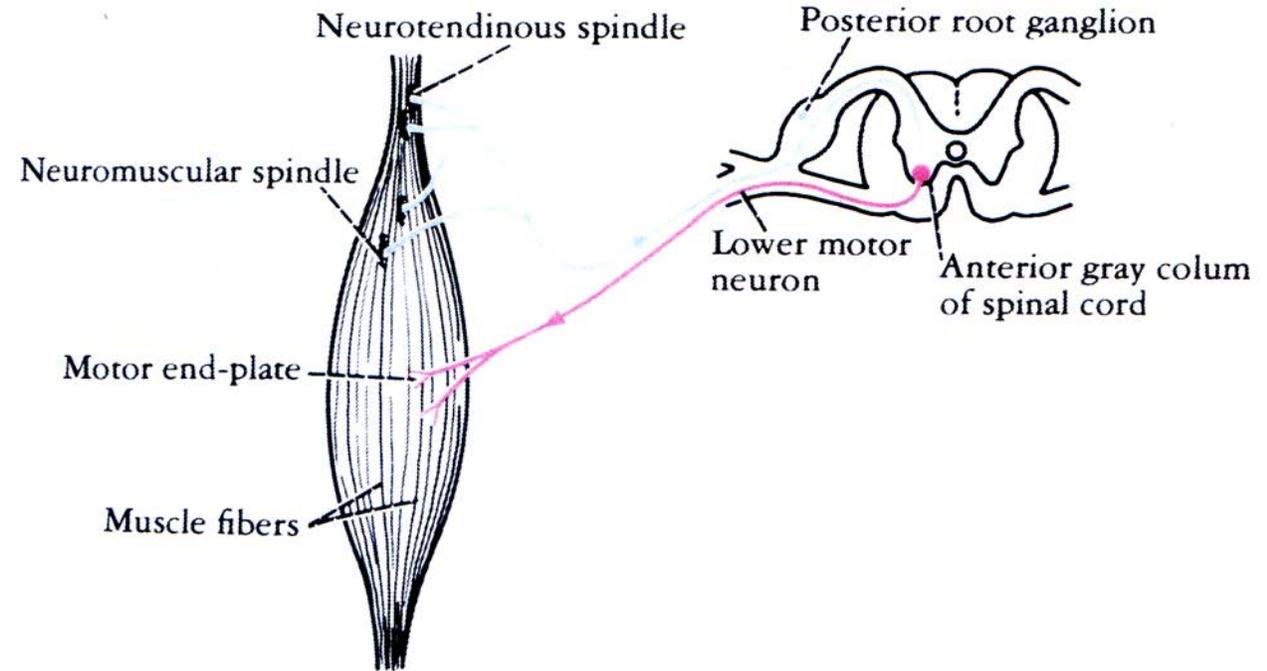
III. Needle Techniques

2. Muscles

Origin —muscles spindles

Belly —motor end plate
[contraction]

Insertion —to the joint or bone



III. Needle Techniques

2. Muscles

1-1. The needle is inserted into spindles—where the muscles attach to the joint or bone.

1-2. The needle is inserted into the belly of the muscles.

1-3. The needle is inserted into the insertion of the muscles.

1-4. The needle is inserted obliquely into the fascia tendon and aponeurosis.

1-5. The needle is inserted perpendicularly, into the muscle fibres.

1-6. The needle is inserted between two muscles—connective tissues.

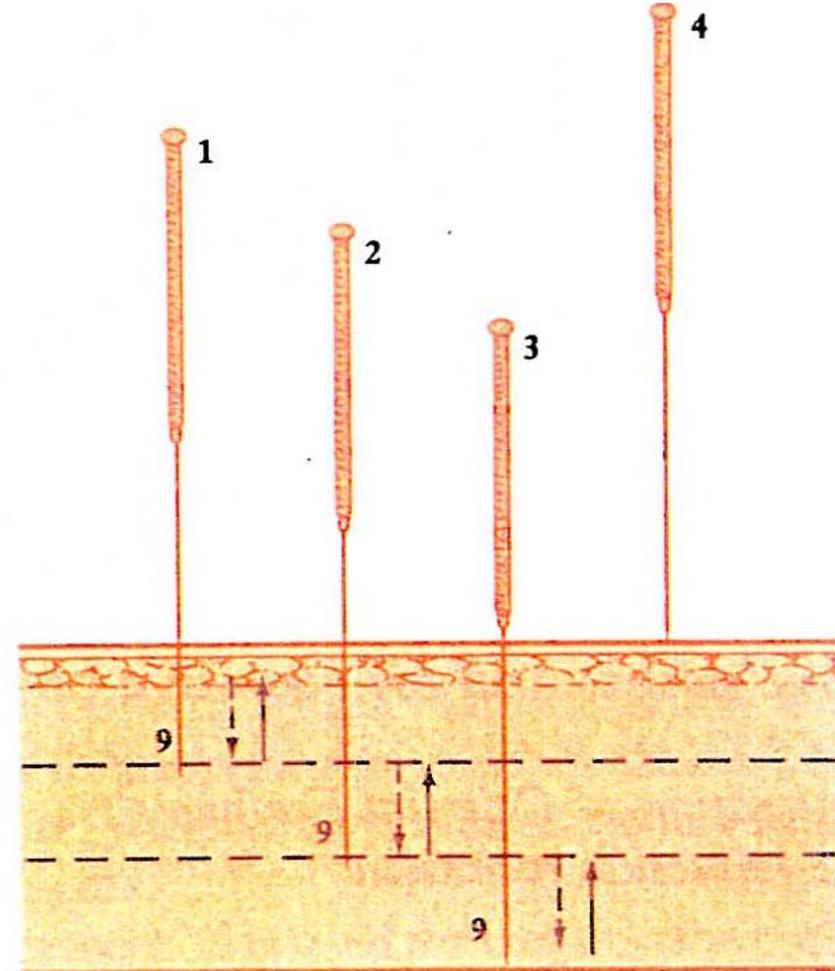
1-7. The needle is inserted into the quadriceps of Femoris.

III. Needle Techniques

2. Muscles

Pure Reinforcement Techniques

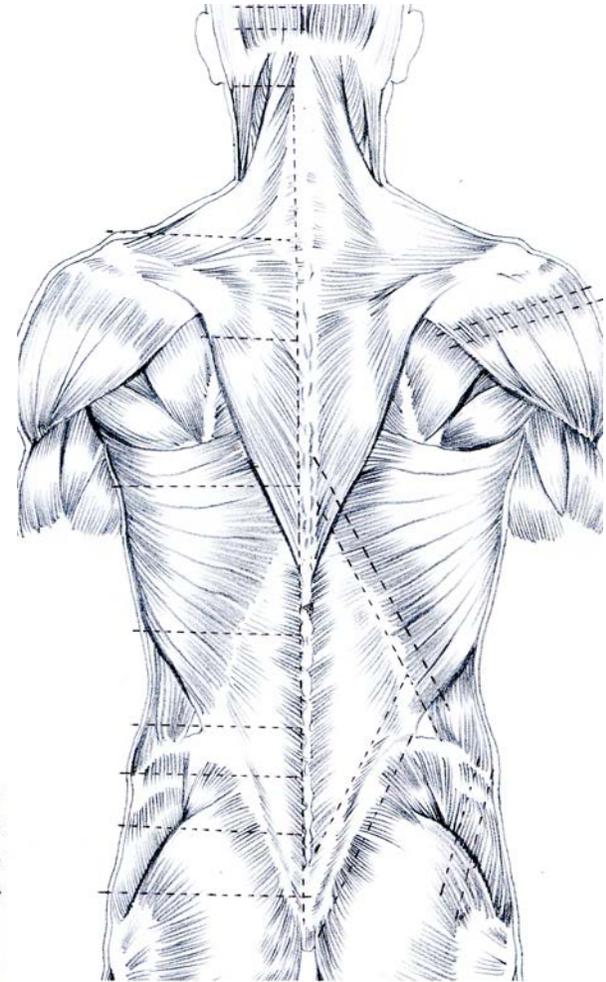
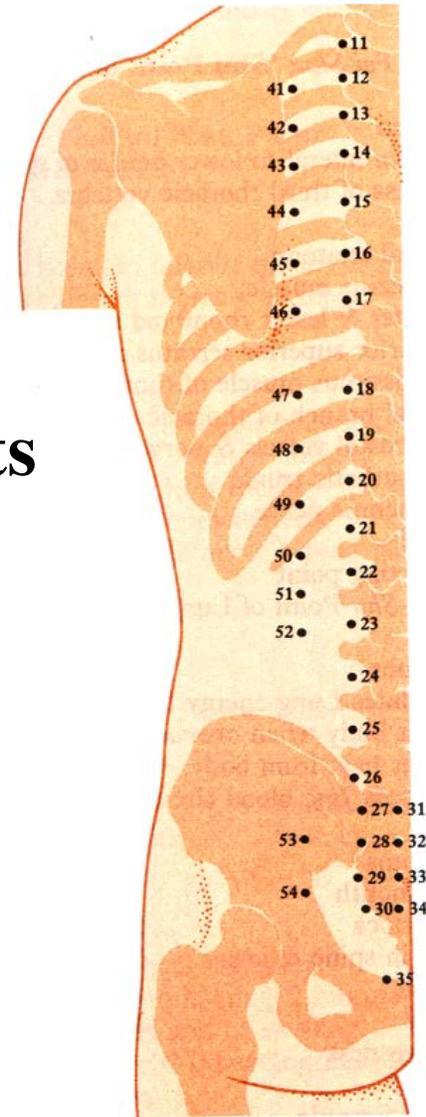
‘Fire Burning the Mountain’



III. Needle Techniques

3. Three Sets of Meridian Points Located on the Vertebral Column:

- **GV, JIAJY and Bladder meridian points**
GV—between two spinous process
- **JIAJI point**—on the side of spinous process [intervertebral foramen, recurrent meningeal nerve]
- **BL meridian two straight line medial**
BL11-35, lateral line BL 41-54.



IV. Show video

Demonstration

**Ben and Debbie stand and walk
with walking frame**

Case: Ben—Quadriplegia

Name: Benjamin

Date of birth: 9/2/1987

Male

Date of accident: 27/10/2012

Date of starting acupuncture treatment: 12/1/2013

Diagnosis:

1-1 Ben was in a severe motor vehicle accident

**Overstretched flexion and extension of the head and neck
caused lesion to the medulla and brainstem neural pathway.**

**1-2 MRI and CT scan report showed C5-6-7 cervical vertebrae
fracture and cord injury**

1-3 Clinically Ben was diagnosed C7 (neurological level) ASIA B

MRI

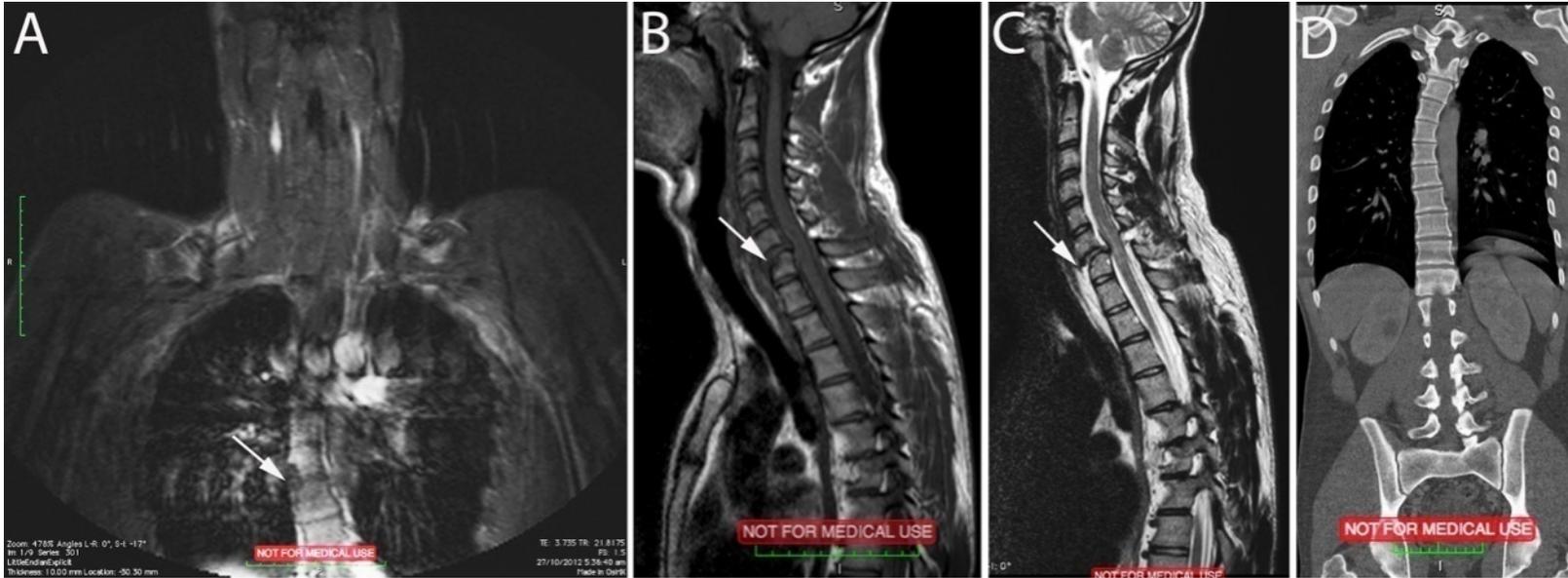


Fig 1. Ben's X-ray images: just after injury (10/2012)

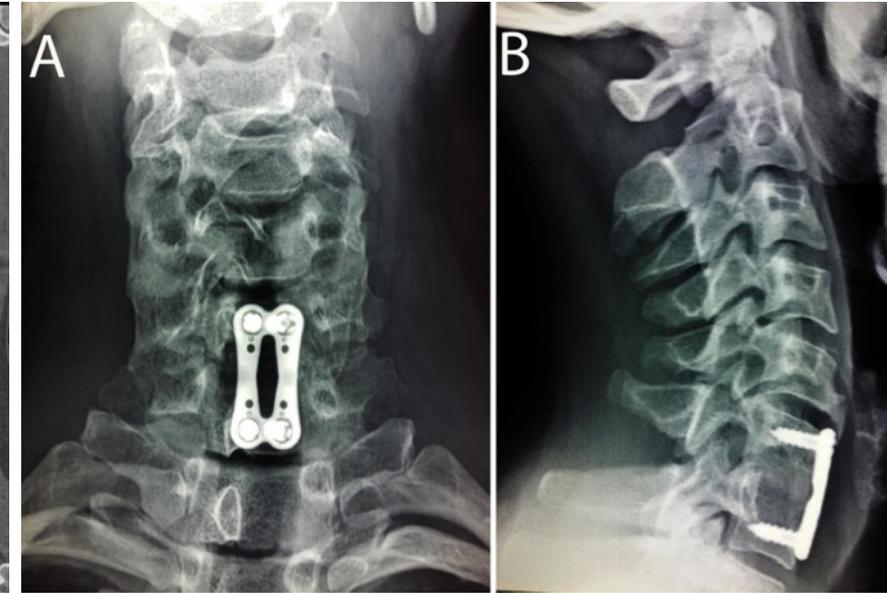


Fig 2. Ben's X-ray images: 4.5 years after injury (16/5/2017)

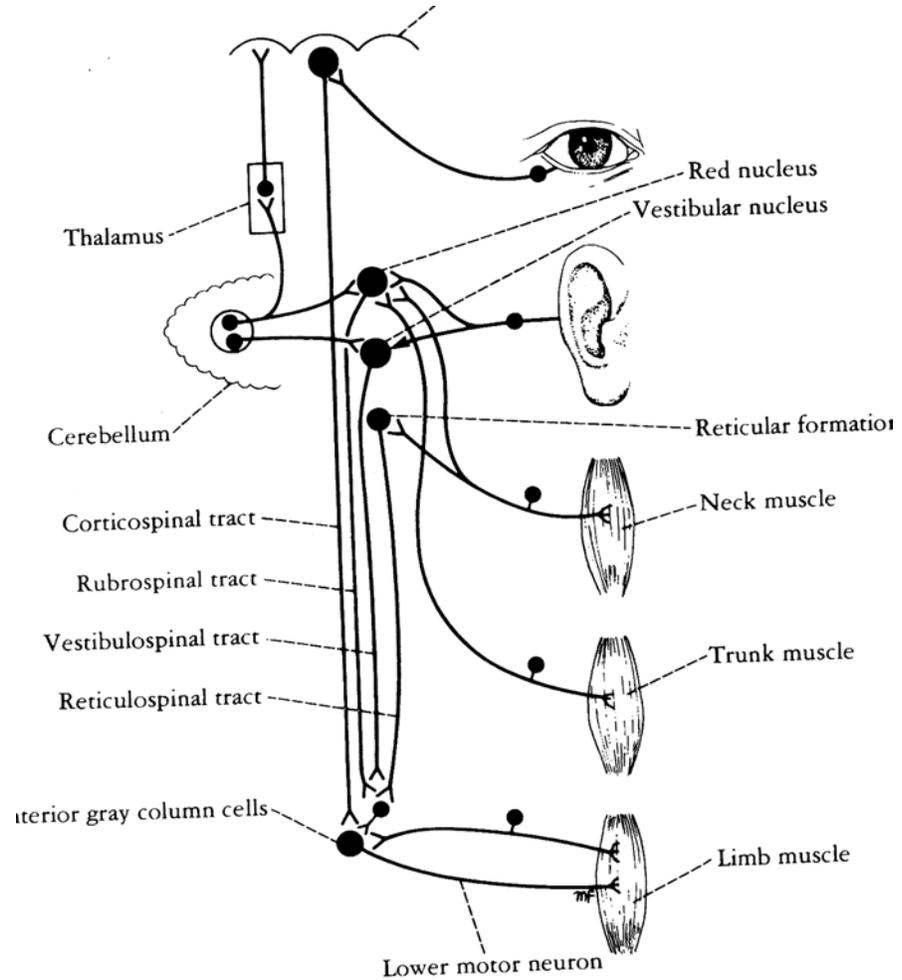


		10/10/12		23/1/13		30/3/17	
		L	R	L	R	L	R
Hip	flexion	0	0	0	0	4	4
	Extension	0	0	0	0	4	4
	Abduction	0	0	0	0	4	4
	Adduction	0	0	0	0	4	4
	Opposition	0	0	0	0	4	4
Knee	flexion	0	0	0	0	3	3
	Extension	0	0	0	0	3	3
Ankle	flexion	0	0	0	0	1	1
	Extension	0	0	0	0	1	1
Foot	flexion	0	0	0	0	0	0
	Extension	0	0	0	0	0	0
Toe	flexion	0	0	0	0	0	0
	Extension	0	0	0	0	0	0

Table 1. Ben's Lower Limb Motor Power

L: left, R: right

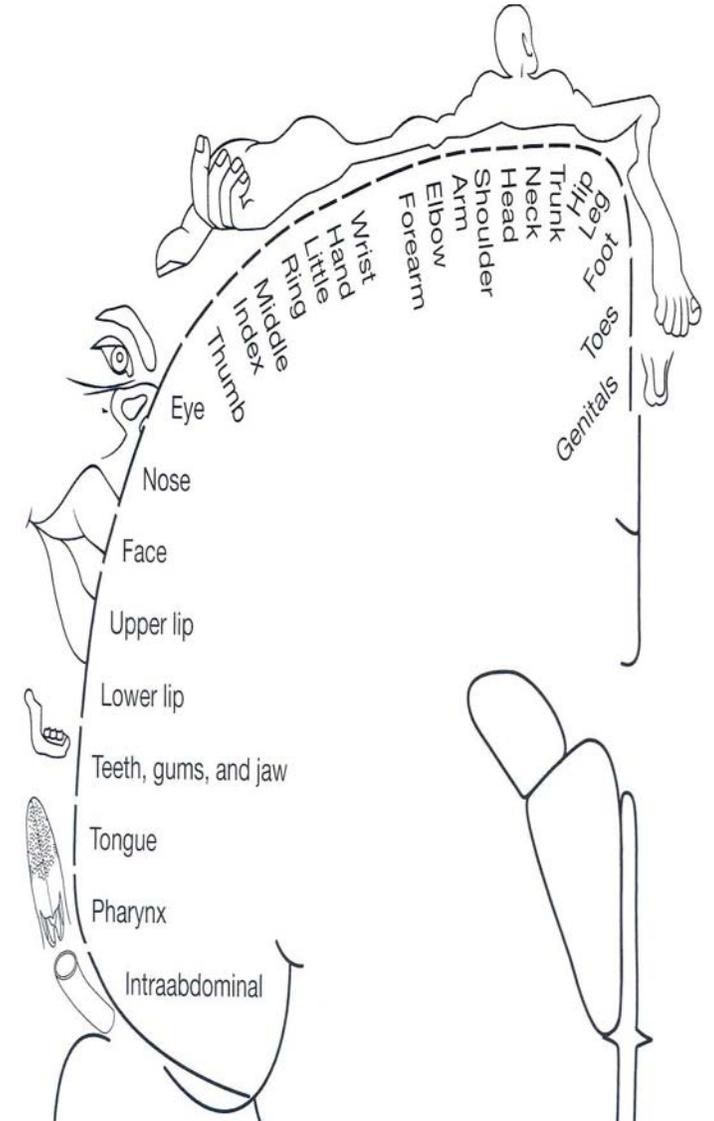
The Lesion Involved the Medulla and Brainstem



Clinical Findings

The neurological examination indicated the syndrome involved the interruption of the Red nucleus, Vestibular nucleus, Reticular formation, Medulla oblongata and the neural pathway.

- The extrapyramidal system is a biological neural network that is part of the motor system causing involuntary movements
- Extrapyramidal tracts are chiefly found in the reticular formation of the pons and medulla and target neurons in the spinal cord involved in reflexes, locomotion, complex movements, and postural control.
- The extrapyramidal tracts include parts of the following:
 - Rubrospinal tract
 - Pontine reticulospinal tract
 - Medullary reticulospinal tract
 - Lateral vestibulospinal tract
 - Tectospinal tract
- Those tracts are in turn modulated by various parts of the central nervous system: including
- Basal ganglia



1-1 The Red Nucleus

A. The syndrome of lesion to the red nucleus: pectoralis, scapular region, posterior superior serratus, rhomboid, or/and trapezius, arm and hand muscles spasticity.

*** Pectoralis: Points selection: LU1-2, ST15-16-17, KI22 KI24, CV15**

*** Biceps: ACU point LI15, LU1, LU4 PC2, and LU5 PC3.**

*** Posterior Superior Serratus, Rhomboid, Trapezius and Tendons: BL 41 to 47 on the edge of spine of the scapular and points on vertebral column BL11 to BL18.**

1-2 Reticular Formation

A. Neural network spino-reticular tracts connected sensory nerve impulses to cerebellum cerebral cortex and via reticulo-spinal tracts descending to the lower motor neurons in spinal cord

B. Vestibulospinal tract assist the reticular formation to maintain muscle tone and balance the body's posture, so when standing and walking, the patient needs to keep the head up and eyes looking forward in a straight position.

C. ACU treatment for reticular formation:

- * Needle insertion stimulates the fingertips, body trunk and extremity points**
- * Moxa stick heats the point for temperature stimulation**
- * Breathing exercises affect the breathing centre and increase reflex activity**
- * Scratching increases joint, muscle and tendon activity**
- * Combining methods may apply**

1-3 Medulla Oblongata

A. Trauma in the anterior median fissure and pyramidal tracts prevents the sensation getting through the olive medulla, then the cortico-spinal tracts cannot send the motor signal to the spinal cord and thus motor movement is impaired.

*** Point location: GB20 BL11 TH17 TH16 GV15 GV16.**

*** GV JIAJI and BL meridian points targets on trapezius, scalene, rhomboid minor or major and levator-scapula muscles. ACU points GB21 GV14 BL11 BL41 TH14 and TH15.**

*** Neck-flexion point selection: LI18, ST5, ST9, ST11, CV22, CV23, TH17**

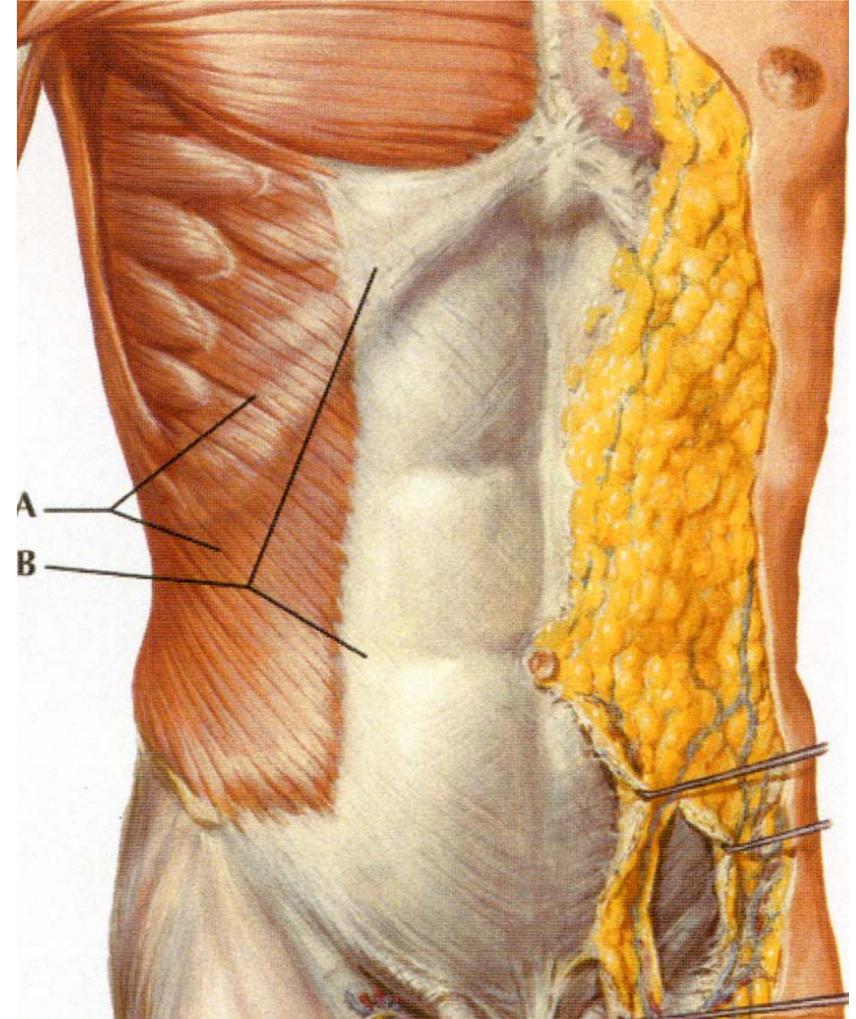
Chest and Abdominal Wall Muscle Points

A. Pectoralis contraction ACU points:

LU1 SP20 PC1 ST16 ST17 KI24

B. Abdominal muscle points:

**ST 19-23-25-27-29, CV3-4-12-14,
SP12,13-14-16, GB25-27-28, Liv14
and KI11,12,13 KI22.**



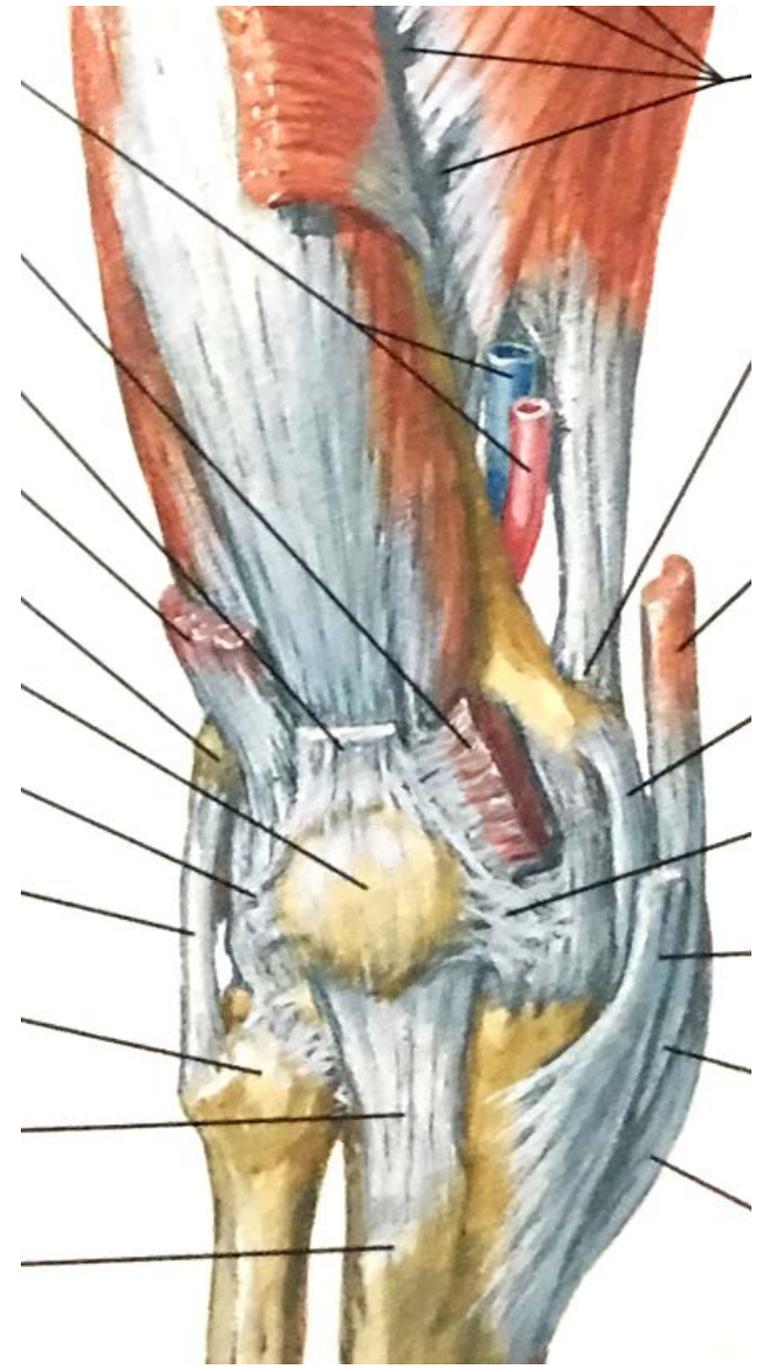
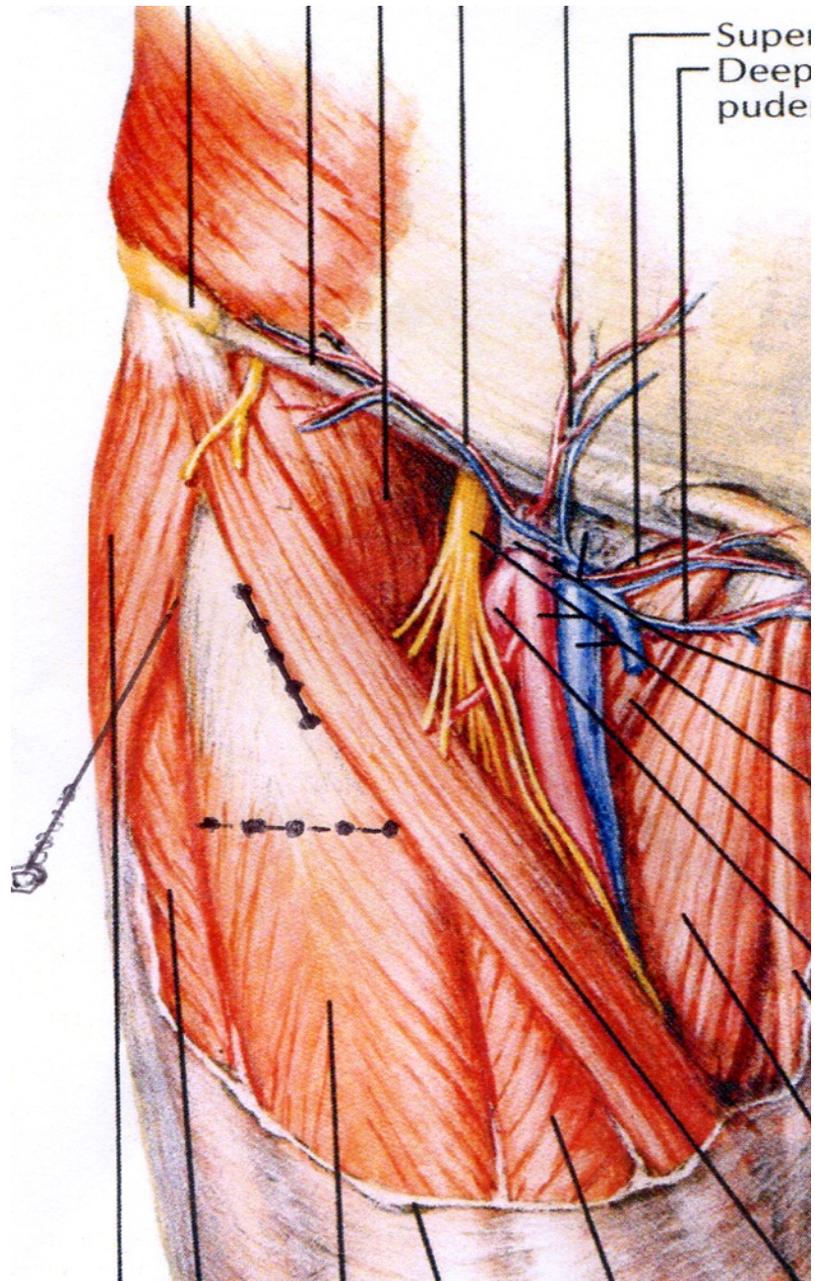
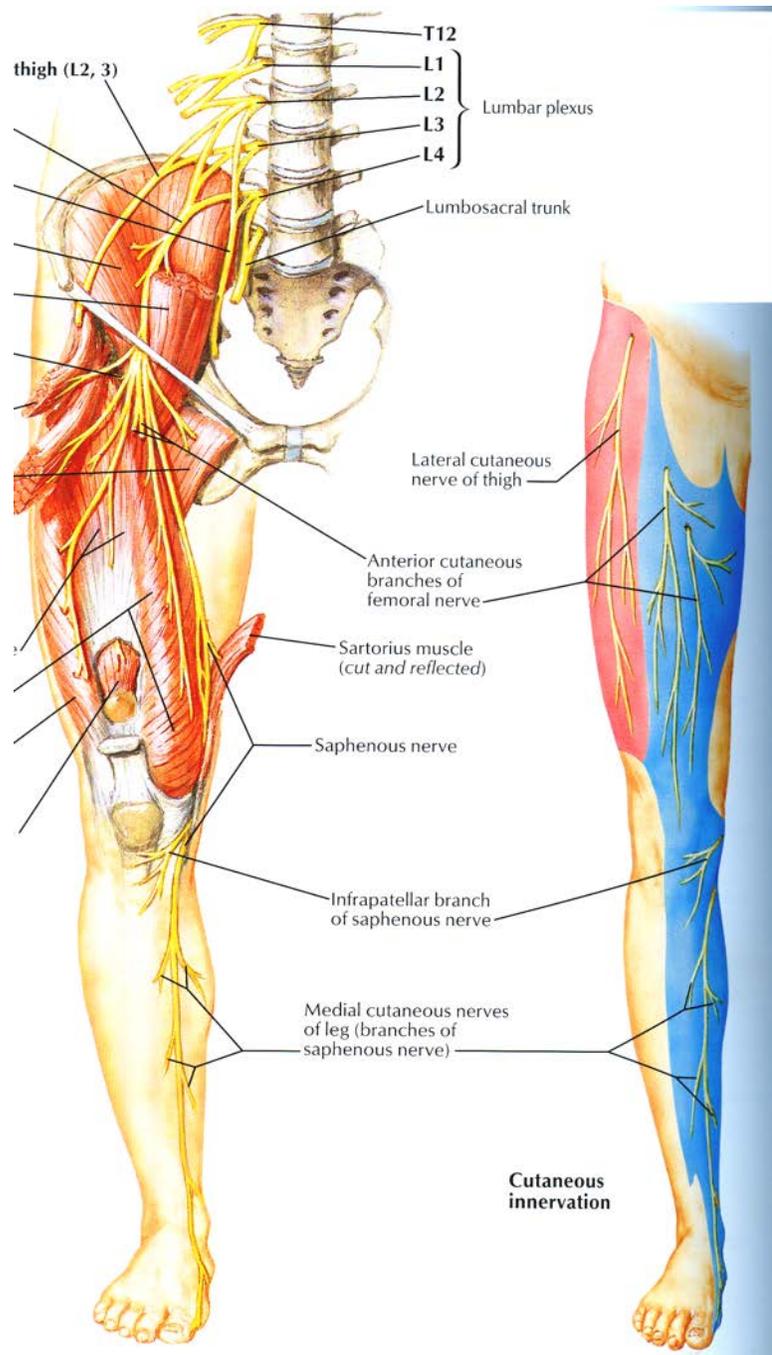
Thigh

A. Major points are on the lumbar-sacral plexuses such as BL22, 23, 25, 26 and BL50,51,52 on sacrum BL27 to BL34, BL53 and, BL54.

B. Tendon and muscle linking points such as tensor fascia latae with gluteus maximus fascia and iliotibial tract with vastus lateralis ACU point GB30 GB31 GB32 GB33.

C. Muscle attachment surrounding the greater trochanter and hamstring muscles ACU points: BL35, 36, 37, 38, 39, 40.

D. Large muscles of the femoris quadriceps and hamstring muscles need to gain equilibrium. Strength especially needs to be gained in the rectus femoris muscles.



Spinal Nerve, Sympathetic and Parasympathetic Nerve

- A. Most of SCI patients have lost the function of urination, sexuality and bowel movement.**

- B. The points selection involved Vagus CNX, BL23,24,25,28,32, GV1,2,4, JIAJI on L3 and L5 vertebrae level.**

- C. Abdominal points included CV1,2,3, KI11,12, ST25,28,29.**

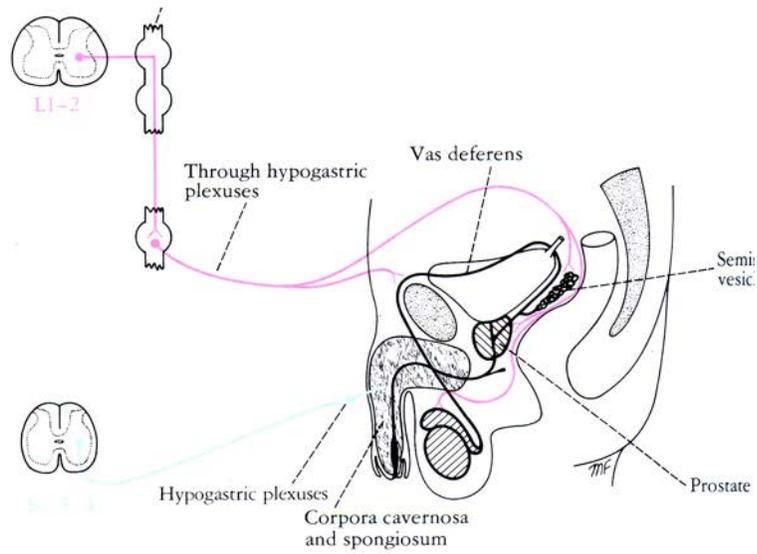
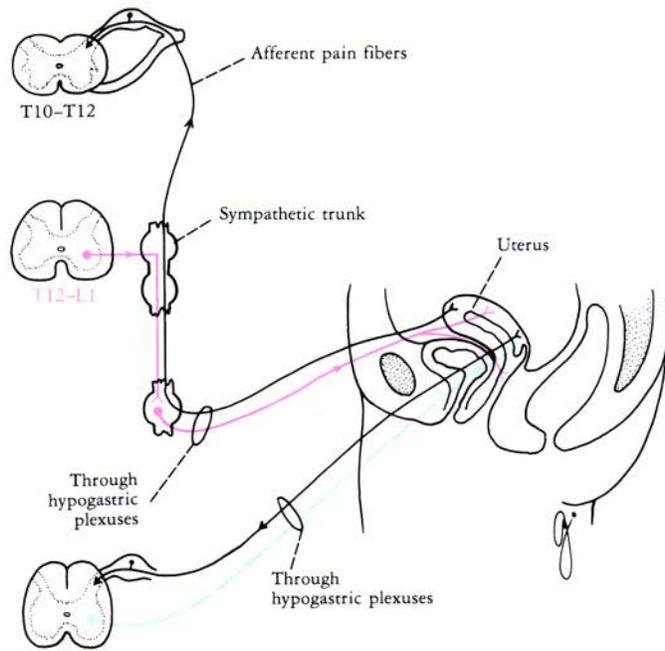


Figure 14-15 Autonomic innervation of the male reproductive tract.



6. Five SHU Points

1.1 Points on apex of fingers or toes:

1-2. Jing-well points

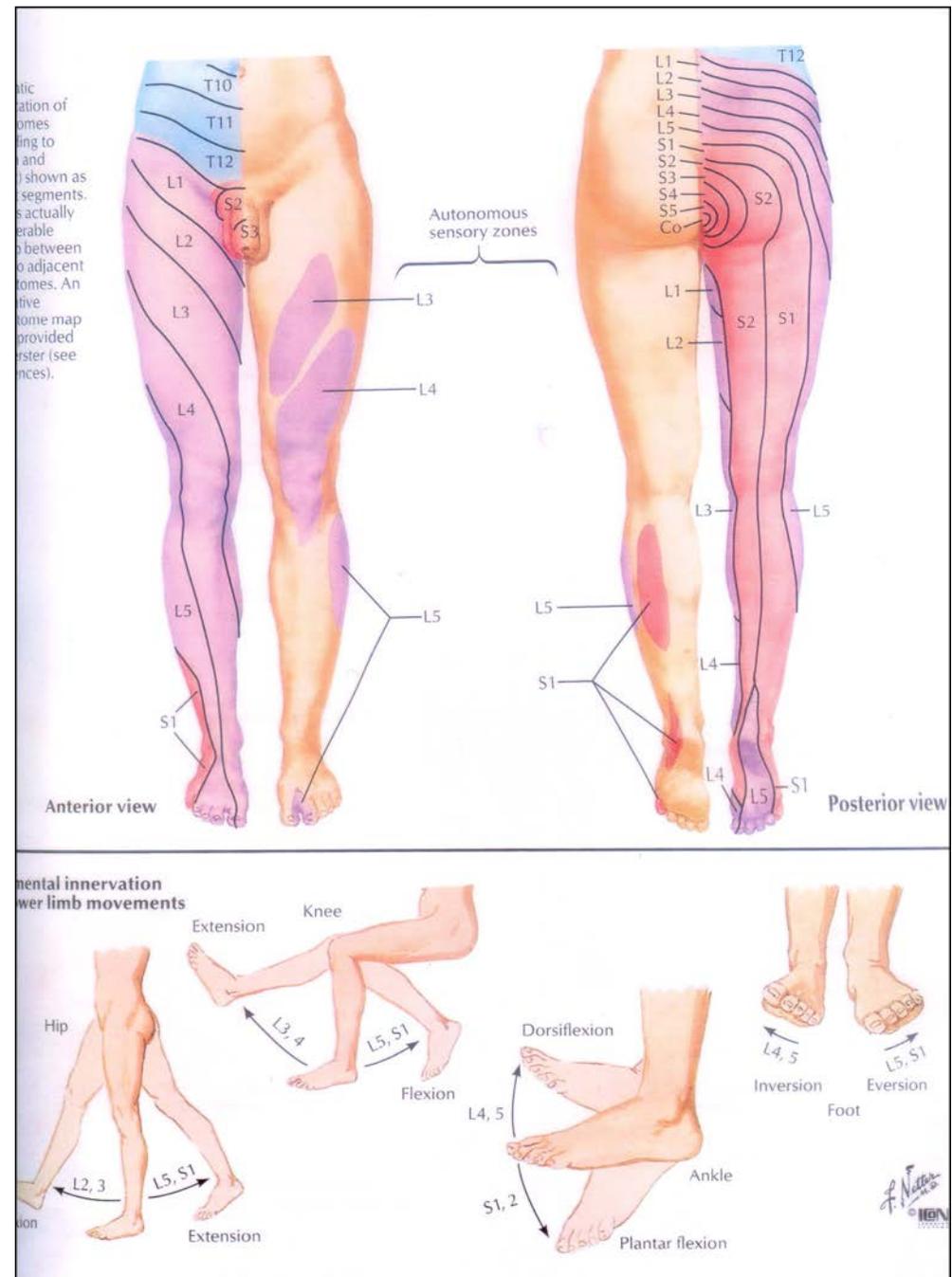
1-3. The Web

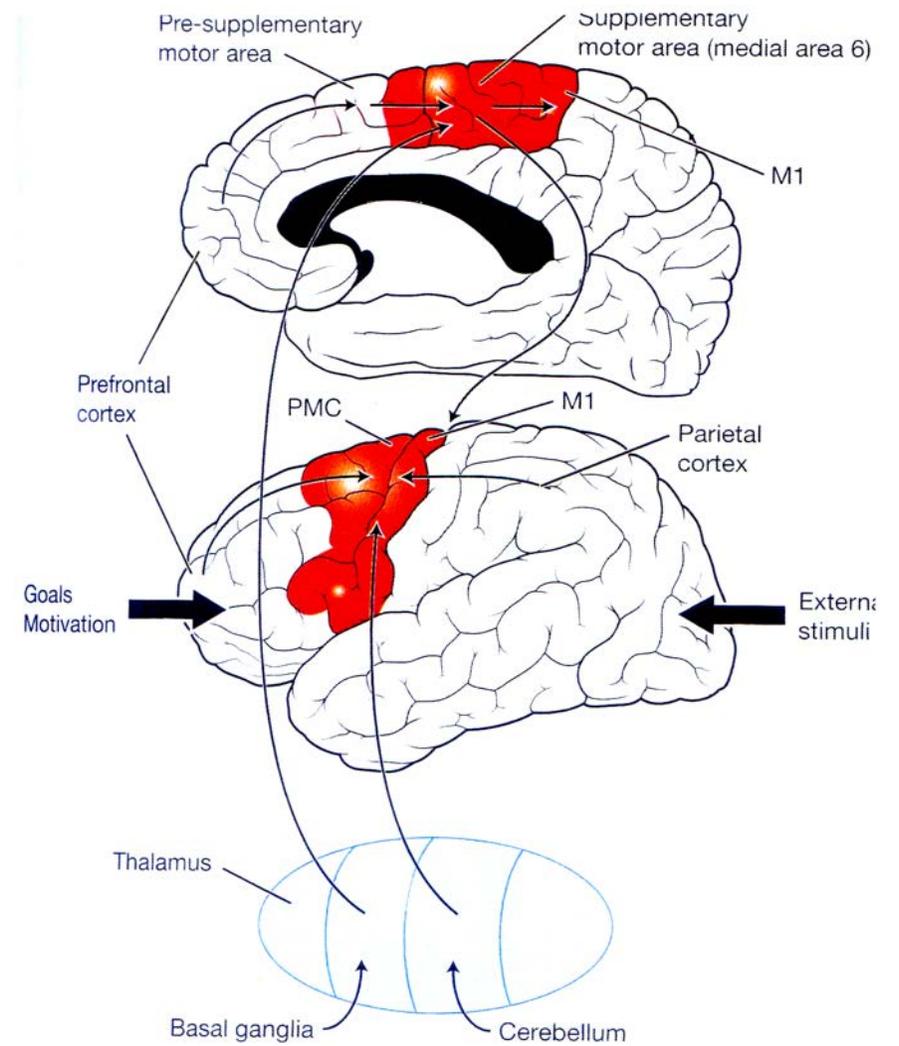
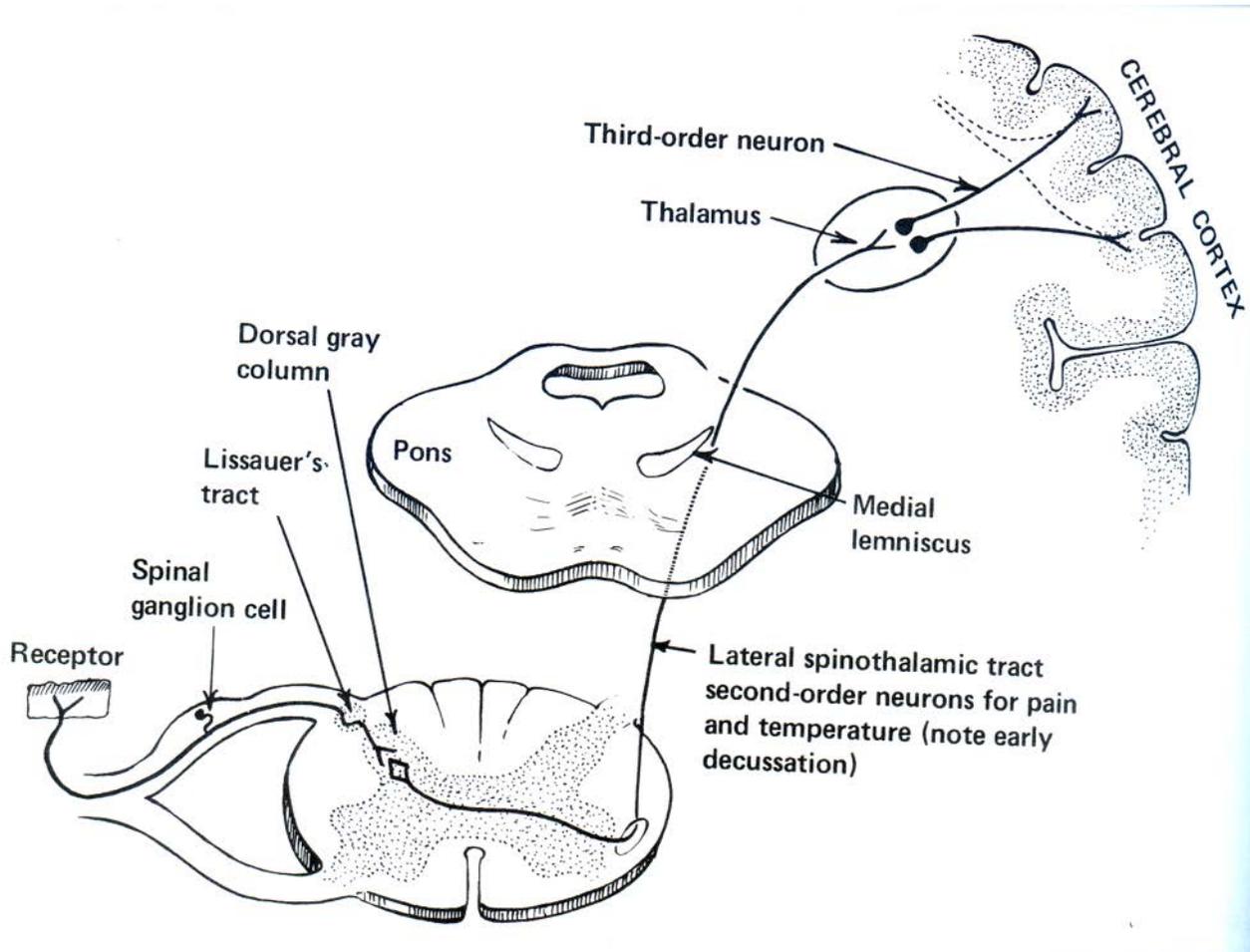
1-4. The phalangeal joint

1-5. The points on the wrists or ankles

1-6. The muscles below the knee:
HE sea points

1.7. The points on palm or planta





Thalamus, supplementary cortex area and primary cortex

Case: Debbie—Paraplegia

Name: Debbie

Date of birth: 21/07/1962

Female

Date of accident: 19/09/2012

Date of starting acupuncture treatment: 12/1/2013

**Accident: Coconut tree fell down front of body and crushed her 3:30pm
19/9/2012 in Bali Indonesia**

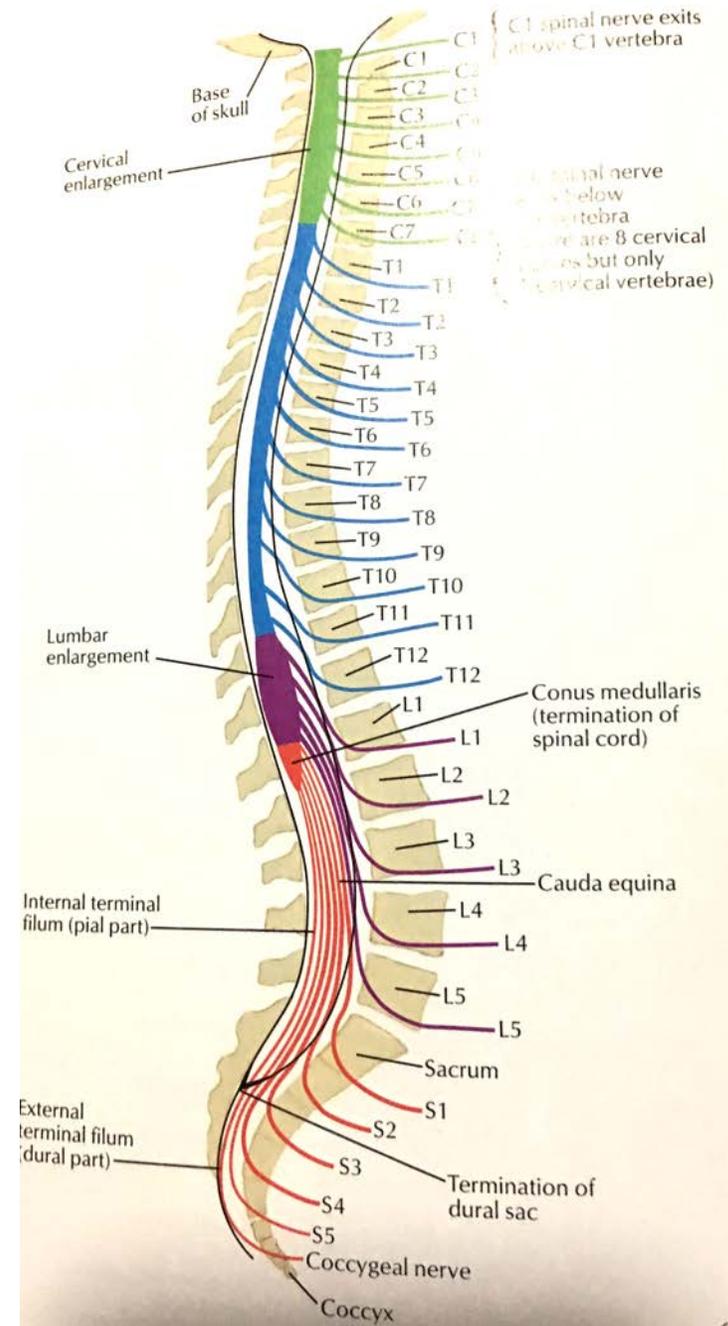
1. Diagnosis

1-1. Debbie was diagnosed “T11 (neurological level) ASIA A”.

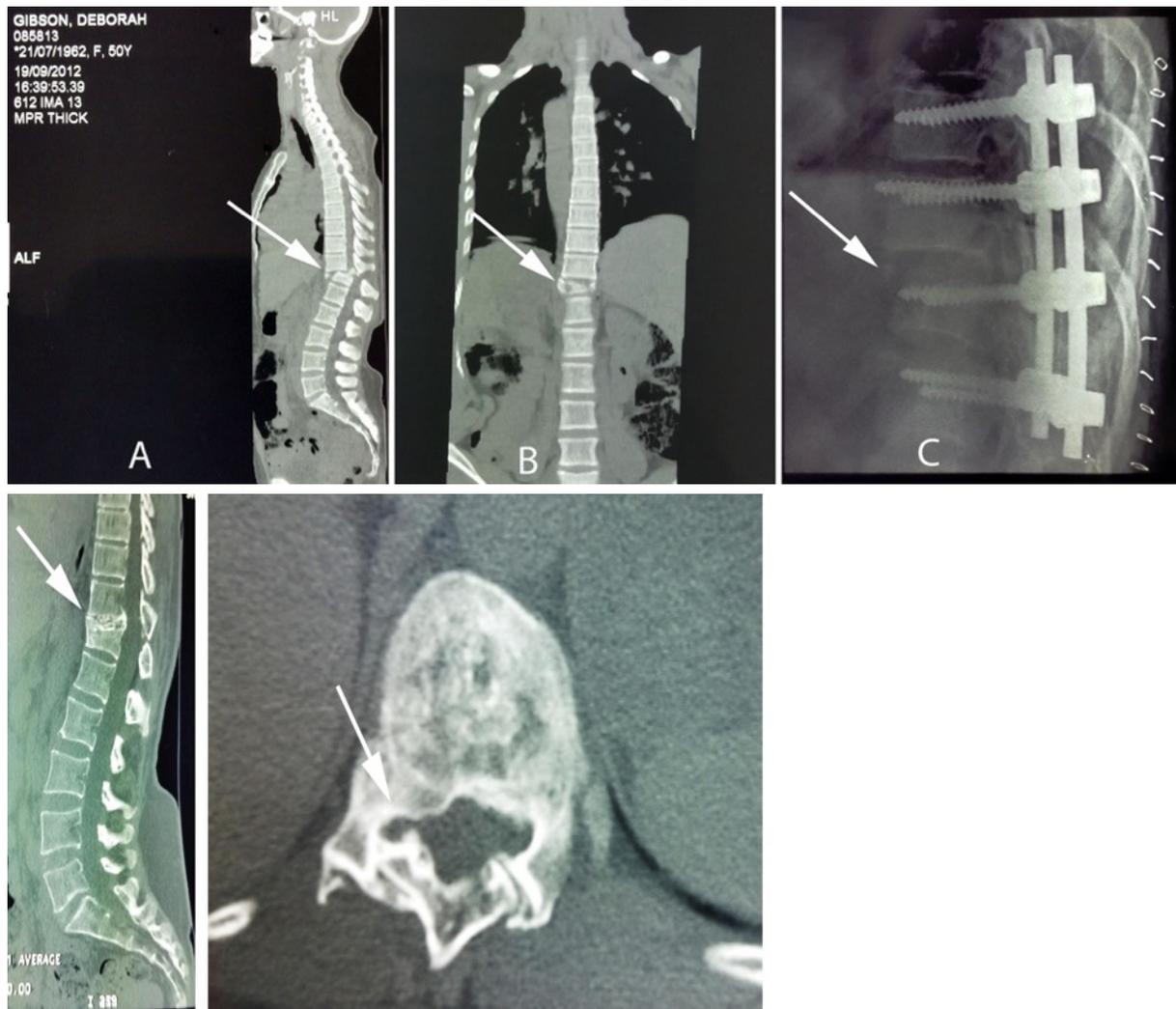
1-2. Both of her hips, knees, ankles feet and toes motor power were “0/5”

1-3. The sensation (proprioception) of both her lower limbs were absent.

Illustration Spinal cord



1. Diagnosis



**Spine CT on 04/06/13 reviewed:
“A compression fracture through T12 is noted. The postero-superior aspect of the vertebral body has retropulsed mildly into the spinal canal. There has been posterior fusion from T10 to L1 with bilateral rods and screws. The T12 vertebral body shows wedged compression. Visualisation of the spinal canal and its contents is obstructed by metallic artefact. The fracture is still relatively acute without obvious healing. The alignment remains, however, satisfactory and there is no spinal canal stenosis.”**

The metallic spinal support was removed on 30/07/2013 at POWH.

		10/10/12		23/1/13		30/3/17	
		L	R	L	R	L	R
Hip	flexion	0	0	0	0	4+	4+
	Extension	0	0	0	0	4+	4+
	Abduction	0	0	0	0	4+	4+
	Adduction	0	0	0	0	4+	4+
	Opposition	0	0	0	0	4	4
Knee	flexion	0	0	0	0	4	4
	Extension	0	0	0	0	4	4
Ankle	flexion	0	0	0	0	1	2
	Extension	0	0	0	0	1	2
Foot	flexion	0	0	0	0	0	0
	Extension	0	0	0	0	0	0
Toe	flexion	0	0	0	0	0	0
	Extension	0	0	0	0	0	0

Table 2. Debbie's lower limb motor power

L-left, R-right

2. ACU Treatment Design

1-1 Release post-operative scars

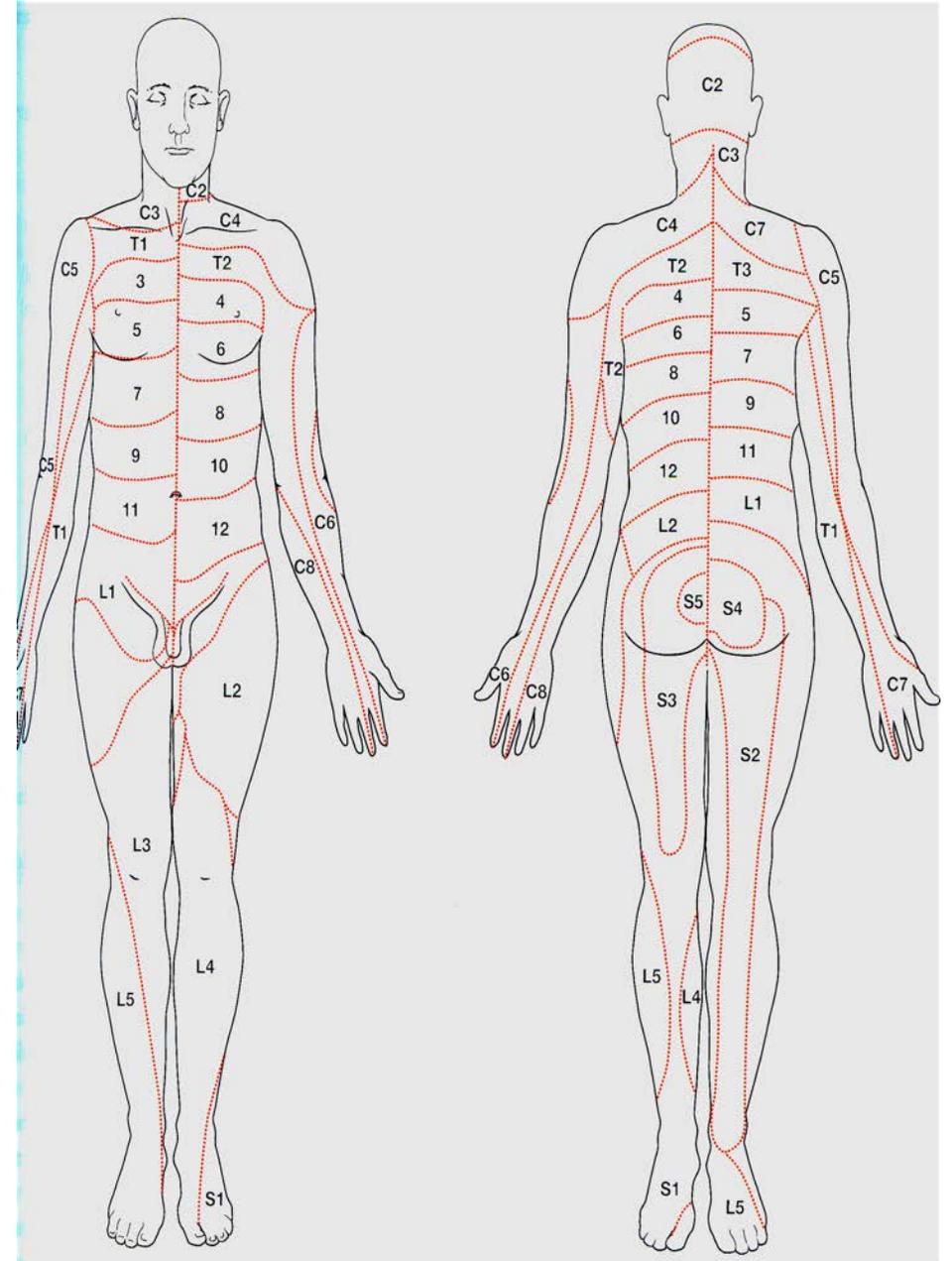
1-2 Treat below spinal cord lesion region

—lumbar, thighs, legs and feet to toes

1-3 Propose distal part extremities management to avoid degeneration and atrophy

1-4 TCM methods: Point selection are Back-SHU & Front-MU points and foot Five-SHU points.

Spina nerves distribution



3. Clinical Findings

- Debbie presented in her wheelchair.**
- Both of her legs had significant muscle atrophy and no resistance in passive movement. The legs were purple in colour with a much lower temperature than other parts of her body. Both of the ankles and feet were swollen. She could not move both legs and had no needle sensation below T11 post-operative scar from T7 to L5.**
- On the front, the abdominal muscles were overstressed and were a mass of contracture. There was no needle sensation below the navel.**

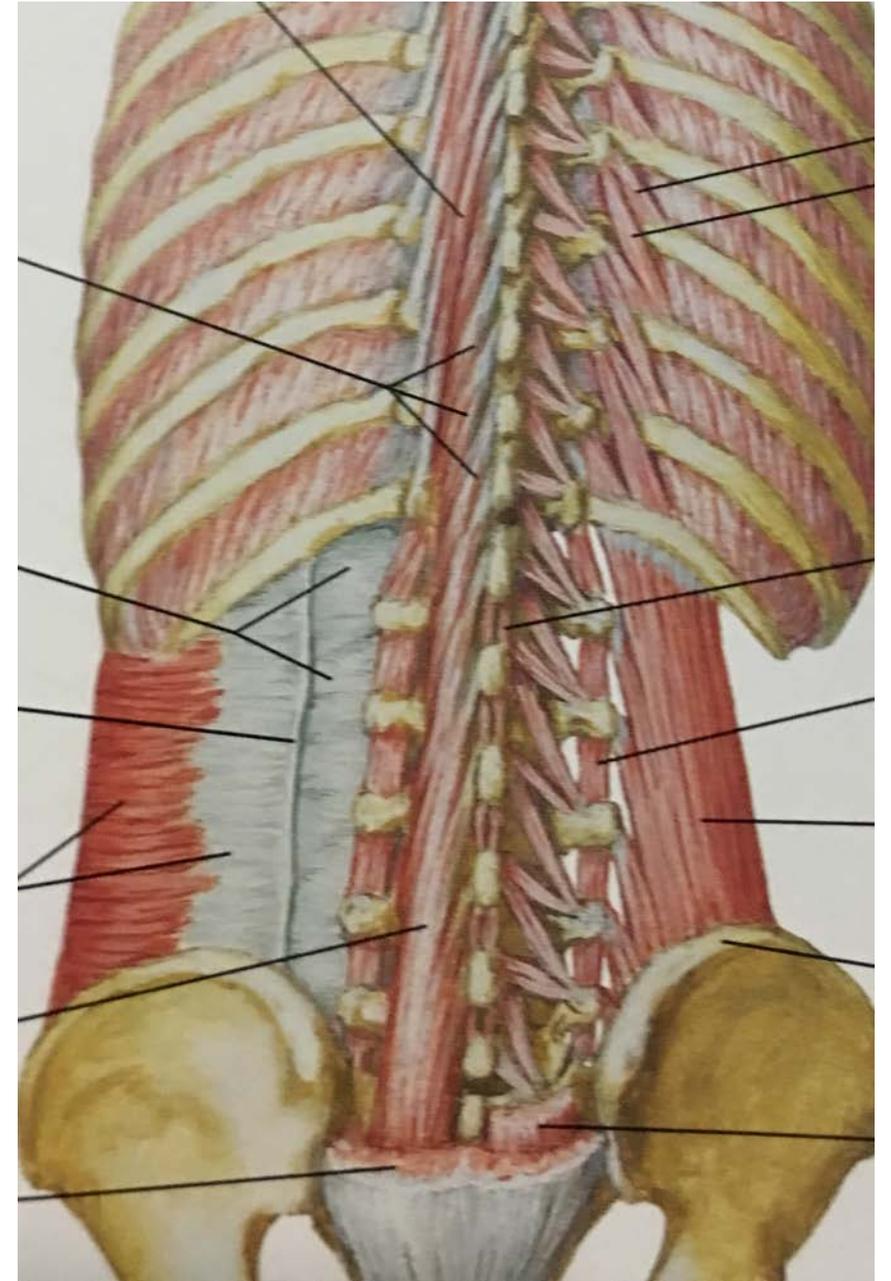
4. ACU Treatment on the Spine and Abdomen

1-1. BL Meridian, GV and JIAJI Points on the Spine

The needle is inserted into the T7 to L5 and down to S4 GV JIAJI.

BL meridian BL15 to BL30 and BL43 to BL54 points.

The needle is inserted repetitively and gently into the points and retained in the points for 30 minutes.



4. ACU Treatment on the Spine and Abdomen

1-2. The Point on the Chest and Abdomen

The needle is inserted into the chest and abdominal wall. The point selections are on ST 19-23-25-27-29, CV3-4-12-14, SP14-16, GB25-27, Liv14, Lu1-2 and KI22.

Method: The needle is gently inserted into the point above the peritoneum.

The lifting and thrusting needle method is applied, the needle is retained for 30 minutes.

After needling; scratching, stretching the chest and abdominal muscles.



5. Standing and Walking

Five months after acupuncture treatment, Debbie could stand up with other people's help and could feel the sensation of pain in both of her thighs.

Nine months after acupuncture treatment, she could lift both thighs and stand up independently.

With another seven months of acupuncture treatment (May 2014), Debbie could walk a few steps with a walking frame.

6. Femur Fracture Accident

After Debbie was able to walk, she attempted to walk with the walking frame. She tried to move out of her wheelchair quickly without help from others. On 29/9/2014 during the first few steps, Debbie fell (4 months after she could walk with walking frame).

This fall completed the bone fracture of her right femur at level 20cm above the knee (Figure 3 A and B arrows indicate the similar point).

Debbie did not go to hospital for an operation but instead used acupuncture as the major treatment for the bone fracture.

1-1. Fracture Management

A. Firstly, using gentle hand traction to let the fractured bone return to the correct postural position, then using an external ‘full leg brace’, support and advice, Debbie maintained the leg, knee and ankle in a straight position for the next two months and no exercise was allowed.

B. The needles were inserted around the fracture site, including ST34-35-36 and GB34, needling perpendicularly deep into the periosteum. The lifting and thrusting needle method is used and the needles retained in the points for 20 minutes.

C. Before needling, moxa stick was used to heat the points. After needling, gentle scratching of the upper and lower lesion section of skin and muscles for increased blood circulation and improvement in wound healing.

D. The specialist agreed with the treatment and closely observed the progress.

6. Femur Fracture Accident



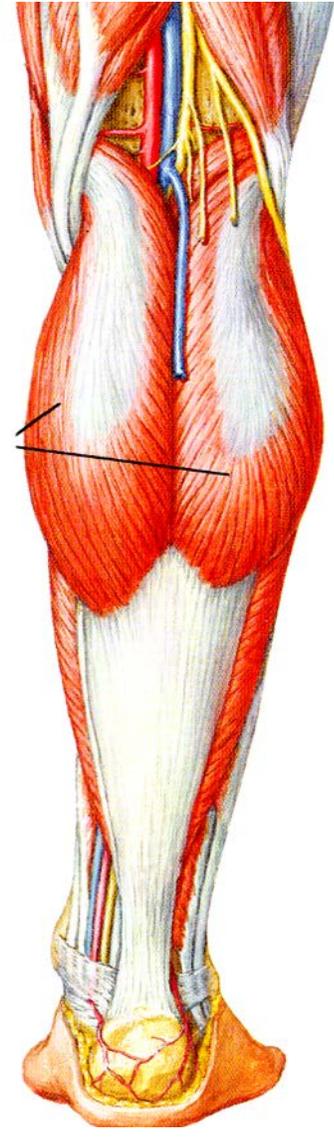
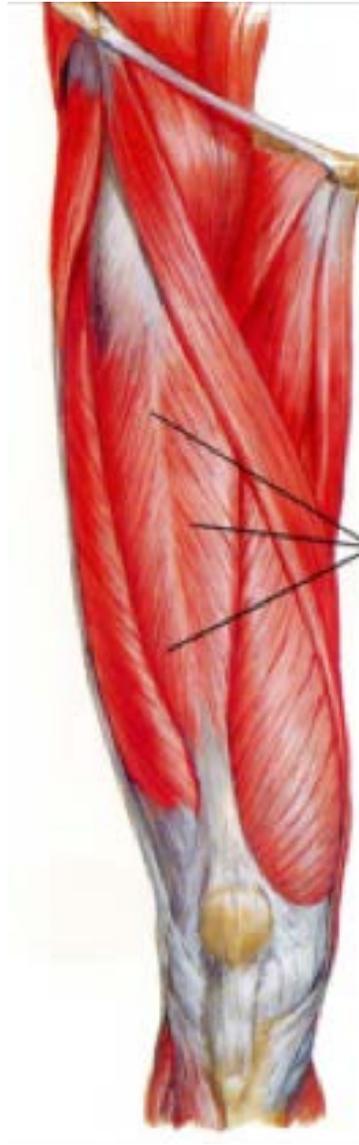
Acupuncture treatment was focused only on the right leg bone fracture in the first month after the bone fracture, then needling on both left and right legs followed. With acupuncture treatment, the bone fracture healed (Figure 6 C, D are the X-rays taken about 1.5 years after the fracture indicated by the arrows) and the right thigh regained muscle strength. Slowly, both legs of the patient got stronger and the patient was able to start to stand up and walk again in Feb 2015 (5 months after right leg bone fracture).

7. Treatment of the Thigh

1-1. Most of the ACU points on the pelvis are on muscles attached to the bone and joint such as GB27 GB28 origin of the quadriceps and the insertion of the patella ST34-35

1-2. The thigh muscles are large and strong and are less innervated. Not many ACU points are found there either. The muscles on the hamstring attach to the tuberosity and sacrum. The BL26 to BL30 and BL36 GB 30 and the Liv 10-11-12 points are located along the ischium and pubic area.

1-3. The tensor fascia latae is the strong tendon that supports the hip and the knee. The lesion was located between the ilio-tibialis tendon and vastus lateral muscles, the point is on GB32 GB33.



8. ACU Treatment Below the Knee

- When Debbie started ACU treatment, Tai proposed starting treatment on both lower extremities but the treatment achieved no response.**
- Point selection: K1-K2 ST36-GB34 BL60-K3 BL40-56-58 SP6-K8 ST40-41**
- After needling passive stretching of the foot and leg followed.**
- Moxa stick heats the point and makes a first-degree burn on the ST36 or SP6 and K1 or K2 alteration point on the BL57-59 or BL40.**
- Temporarily after needling no response was shown.**
- Moxa on the skin made it red in colour or blistered (preferably, a hole is gently made in the blister to release the fluid), the skin was palpated and Debbie's leg felt warm.**

8. ACU Treatment Below the Knee

1-1. Proposal of ACU treatment on 12/05/2016:

Only the right leg from the knee down to the foot would be treated. No treatment was provided to the left leg which was to be used as a comparison for the research.

1-2. Both legs are weak, the muscles are in a pre-atrophy condition and there is no muscle resistance on passive lift up and down, no skin sensation or muscle movement. The tone in the muscles of the left leg above the knee and in the thigh is better than in the right.

8. ACU Treatment Below the Knee

1-1 In the first three months of intensive ACU treatment of the right leg, the repetitive needling method is used and more needles are retained. Needling mostly focuses on the individual muscles from the origin of the muscles to insertion of the muscles of the tibialis anterior and posterior and the extensor digitorum longus.

1-2 The needle is inserted into the points K6 and BL61, SP6 and BL58-59-60, which involve the calculus tendon and gastrocnemius soleus muscles. Repetitive needling, scratching and stretching tries to move the tendon and muscles.

1-3 Moxa heats the points and especially provides the first-degree burn on K1 K2 ST36 SP8 BL40 and BL56, which is for prolonged stimulation.

1-4 Gentle scratching and passive movement is provided after the needling and moxa heat.

8. ACU Treatment Below the Knee

1-5 After six months of treatment the right leg shows better improvement. The right leg can lift the knee higher than the left and the muscles show tone. The ankle also shows it can move with the leg. The left leg remains the same, it feels cooler. When needling into the points of the right foot during the morning treatment, Debbie reported she could feel tingling in her left foot but not in the right at night.

1-6 Debbie realised there was a big difference in her leg which was getting ACU treatment compared to the one that was not. The gentle ACU treatment on the left leg, did not improve to the same level as the right. Debbie then asked for a strong treatment on the left leg which improved it to the same level as the right.

1-7 On 20/11/2016, when the needle was inserted into plantar points of the right foot, Debbie felt tingling on the left foot and it was hot at night in bed, however, when needling the left foot plantar points K1 and retaining the needle in the point, she felt she wanted to move her right foot but the foot did not move.

8. ACU Treatment Below the Knee

1-8 Progress on the legs was slow. It took two years of strong ACU treatment to achieve a weak tone in the leg muscles and another year to regain sensation in the ankle.

1-9 It is only when Debbie was able to mobilise her ankle that she was able to place her body weight on her foot and walk sufficiently. She still needs more practice with her walking and stretching exercises but this will come with time.

**** In October 2017, Debbie stands using crutches with the help of her carer and takes a few steps out of her wheelchair.**





