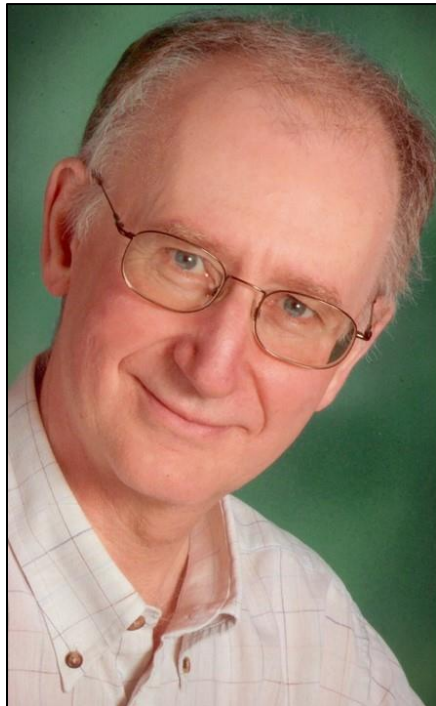


Western Medical Acupuncture



BILL FERGUSON

BSc (Hons) Pure Chemistry, MSc Agricultural Biochemistry,
MRSC Chartered Chemist, DO

Osteopath
Acupuncturist
Tenterden, Kent UK

PRESENTATION DECEMBER 2018 | ARRECIFE, LANZAROTE

The sum of human knowledge is increasing rapidly. So rapidly that it can be overwhelming to try to keep up to date in one's own specialty, let alone anyone else's. The Academia gives members and guests the opportunity to learn about a diverse range of topics from presenters who have fresh and first-hand knowledge of their subject.

In recent years, thanks to improved methods of medical imaging and analytical techniques a lot of new scientific information has been obtained about the effects and mechanisms of Acupuncture. We can identify areas of the brain that are active or inactive using Positron Emission Tomography, a non-invasive technique that allows real-time changes to be observed in response to stimuli. Analytical techniques now exist that allow the measurement of tiny quantities of chemical substances in the body fluids and tissues. At last we have a Western Medical Acupuncture model that is solidly based on the anatomy and physiology familiar to modern Healthcare professionals.

I want to tell you about some of the mechanisms that have been revealed by researchers over the last few decades. Mechanisms that explain, in the language familiar to doctors and healthcare professionals, just what happens when we put these little needles into our patients.

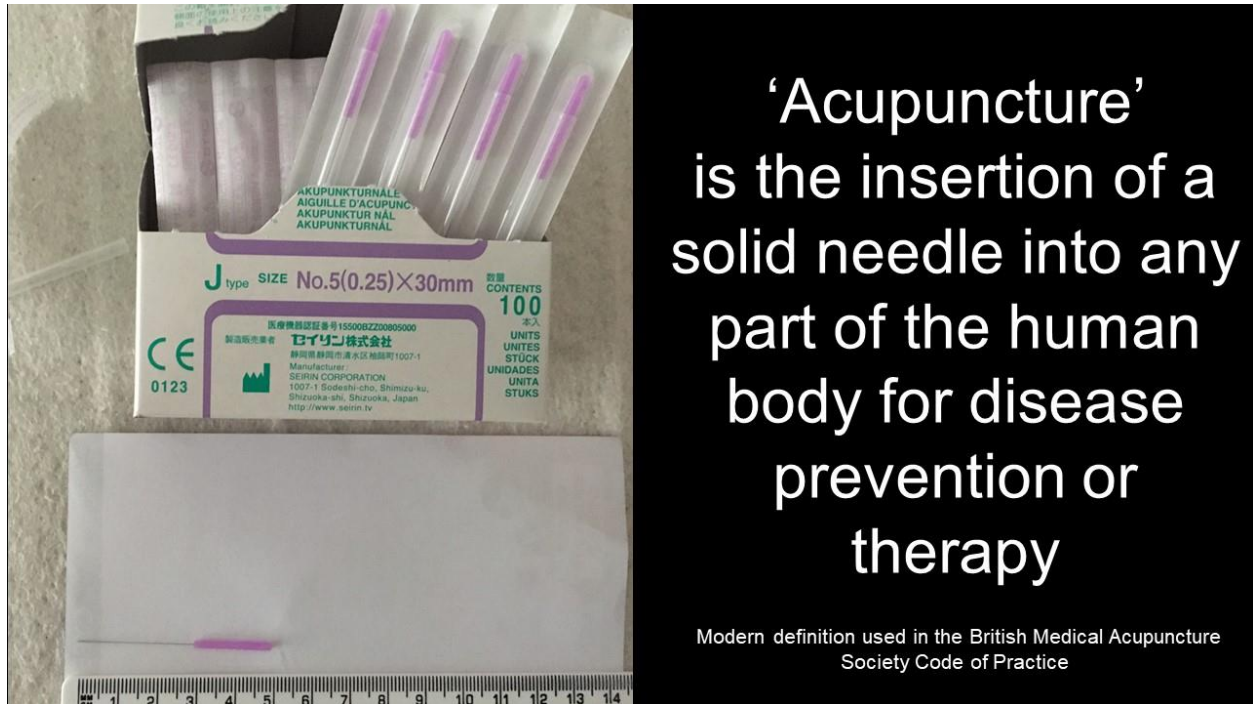
HISTORY OF ACUPUNCTURE

Some history. When asked, where did acupuncture originate? Most people would probably reply, China. But in September 1991 the body of a Bronze Age hunter was found in a melting glacier in the Italian Alps. Named Otzi the Iceman, he died 5,300 years ago and on his body were tattooed lines and crosses in places where we would treat today for arthritic knee pain, arthritic spine pain and stomach pain. At autopsy he was found to have osteoarthritic degeneration of the spine and knee, and a worm infestation in his stomach.

The oldest Chinese written records are less than 3,000 years old. Which means that for now, the oldest evidence for acupuncture is European!

More recently. In 1821 a London surgeon James Morss Churchill published a series of case histories of patients cured by “Acupuncuration”¹. His approach was quite straightforward, he inserted a needle where the patient complained of pain. If the pain moved he would move the needle to the new place of pain and repeat the process until the pain had been driven out of the body. His case histories include rheumatic pain, low back spasm and debilitating intercostal pain that he claims to have cured completely with his needle.

Eighty years later a Canadian doctor William Osler recommended that painful muscles should be treated with hat pins or darning needles. The treatment was simple: you pushed the needles into painful points.



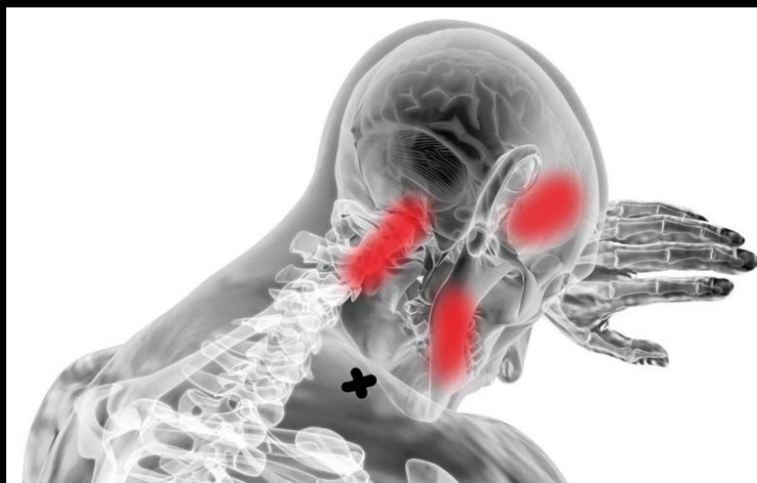
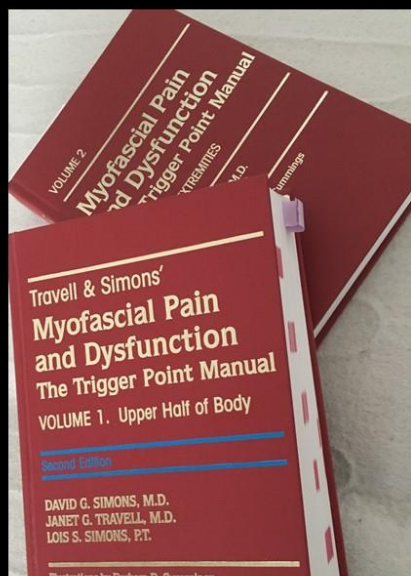
‘Acupuncture’
is the insertion of a
solid needle into any
part of the human
body for disease
prevention or
therapy

Modern definition used in the British Medical Acupuncture
Society Code of Practice

Nowadays we use sterile needles that are used only once. They can be bought in different lengths 3cm is most common, the longest I have used is 12.5cm. The needles are very fine. Unlike a hollow hypodermic needle which cuts into tissue, acupuncture needles are solid, polished steel shaped like a javelin, which rarely cause bleeding or tissue trauma and when the needle is withdrawn at the end of a treatment the hole closes up immediately.

“Acupuncture is the insertion of a solid needle into any part of the human body for disease prevention or therapy.”

In 1971 James Reston from the New York Times was part of the press corps accompanying President Nixon on a diplomatic visit to China. His first-hand account in the newspaper described how he was successfully treated with acupuncture for post-operative pain after having his appendix removed. The story was widely syndicated and created a lot of popular interest.



Trigger point in trapezius

My first exposure to any type of acupuncture was when I bought a pair of books by Travel and Simons. Their 1600 pages of detailed anatomy and treatments of myofascial pain was published in 1983 and introduced the term “trigger point” into the physician’s vocabulary. Trigger points are small areas of tenderness within bands of contraction in muscles that refer pain to adjacent areas. For example, a trigger point in the trapezius muscle might refer pain to the neck, jaw or side of the head. One way of deactivating a trigger point is to penetrate it with an acupuncture needle.

Later, through my work as an Osteopath I became acquainted with Joyce Lawson-Wood, the widow of Denis Lawson-Wood, who taught the first acupuncture course in the UK. She kindly gave me a copy of his course from the 1950’s and from this I was able to study some of the concepts underpinning traditional Chinese medicine.

Traditional Chinese medicine is based on diet, herbs, exercise, psychological counselling, manipulation and needles and has a philosophical basis that is very different to Western medicine.

I was intrigued as I read about yin and yang, meridians and five element theory, master points, moxa, times of day for certain treatments and many other rules and recommendations. Fascinating as this was, it didn't sit comfortably with my Western style training and education. I filed the topic of Acupuncture in the category of "one-day, maybe".

Fifteen years later, my interest was reignited. I discovered a series of books by Dr Felix Mann, a London doctor who in the 1970's, taught himself Chinese and visited China to learn about acupuncture. Originally his books consisted of case histories and recipes for treatment. He later came to believe that acupuncture points were not as specific as he had been taught and that since he could find no scientific way of measuring meridians, that they probably did not have any relevance to the way he worked.

Despite this rather heretical view, Dr Mann was able to incorporate acupuncture into conventional Western medicine and he became the founder of what is now the British Medical Acupuncture Society (BMAS).

Since 2005 I have attended many conferences and classes with BMAS and in this way became familiar with the use of Western medical acupuncture in Europe and Scandinavia. I am especially indebted to Dr Mike Cummings, the Medical Director of BMAS whose ability to explain complicated research findings in a concise and logical way kindled an enthusiasm and curiosity that I still feel nearly 14 years after needling a patient for the first time. For anyone who wants to make a study of this fascinating topic, I recommend the book "An Introduction to Western Medical Acupuncture³" which he co-authored with Adrian White and Jacqueline Filshie.

“if we try to reconcile the traditional Chinese model with the Western medical model, it is like trying to believe that the earth is flat and spherical at the same time.”

In the book there is a metaphor: “if we try to reconcile the traditional Chinese model with the Western medical model, it is like trying to believe that the earth is flat and spherical at the same time.”

I want to emphasise that I am not saying that the Chinese model is wrong or less clinically effective. The Chinese system with its many levels of complexity works very well for the practitioners trained in its application. But there is another model that fits more comfortably with our scientific body of evidence and that is the one I want to tell you about.

EXPERIMENTAL EVIDENCE

I would like to begin with two important pieces of experimental evidence.

Experiment #1

An experiment performed in 1974 with rabbits. You can measure a rabbit's tolerance to pain by electrifying the floor of its cage. When the stimulus becomes painful the rabbit will show distinctive avoidance behaviour.

Observation 1

A rabbit will show greater tolerance to pain after acupuncture.

Observation 2

A rabbit that has not received acupuncture itself but has received some cerebrospinal fluid from another rabbit that has received acupuncture will show increased tolerance to pain.

Conclusion

There is something in the cerebrospinal fluid of the treated animal that increases pain tolerance. That “something” was subsequently found to be endorphins, opiate-like chemicals that act as neuromodulators and reduce the sensation of pain.

Experiment #2

When an acupuncture needle is inserted into a muscle, there is an increase in the electrical activity of the nerve trunks leading away from the treated area. If the same muscle is first numbed with local anesthetic and then needled as before, there is no increase in electrical activity.

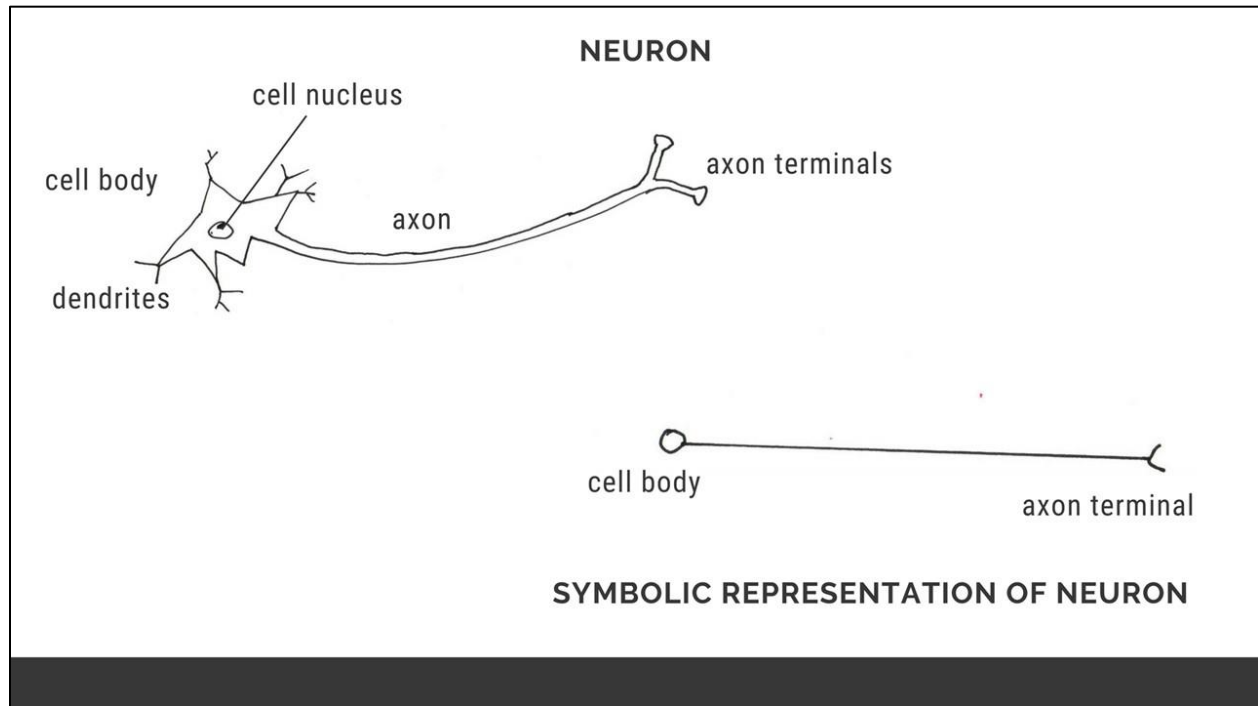
Conclusion

This demonstrated that acupuncture works through the nervous system and that for acupuncture to work there must be a normal nervous system and a perceivable sensory input.

Before we investigate the processes that occur during acupuncture I would like to review some basic neuroanatomy.

ANATOMY OF THE HUMAN NERVOUS SYSTEM

The human nervous system is made up of nerve cells, called neurons.



A typical neuron has a cell body from which extend one or more filaments called axons. There are shorter extensions from the cell body called dendrites. Neurons communicate with each other by sending chemical signals from the axon of one neuron to another cell. This takes place at a junction called a synapse. It was once believed that the synapses were electrical contacts but in 1906 Santiago Ramón y Cajal, working in Madrid, was awarded a Nobel Prize for his discovery of the synaptic space. This is a physical space between the two surfaces of the synapse. When a nerve impulse arrives at the end of the axon it causes the release of neurotransmitters into the synaptic space.

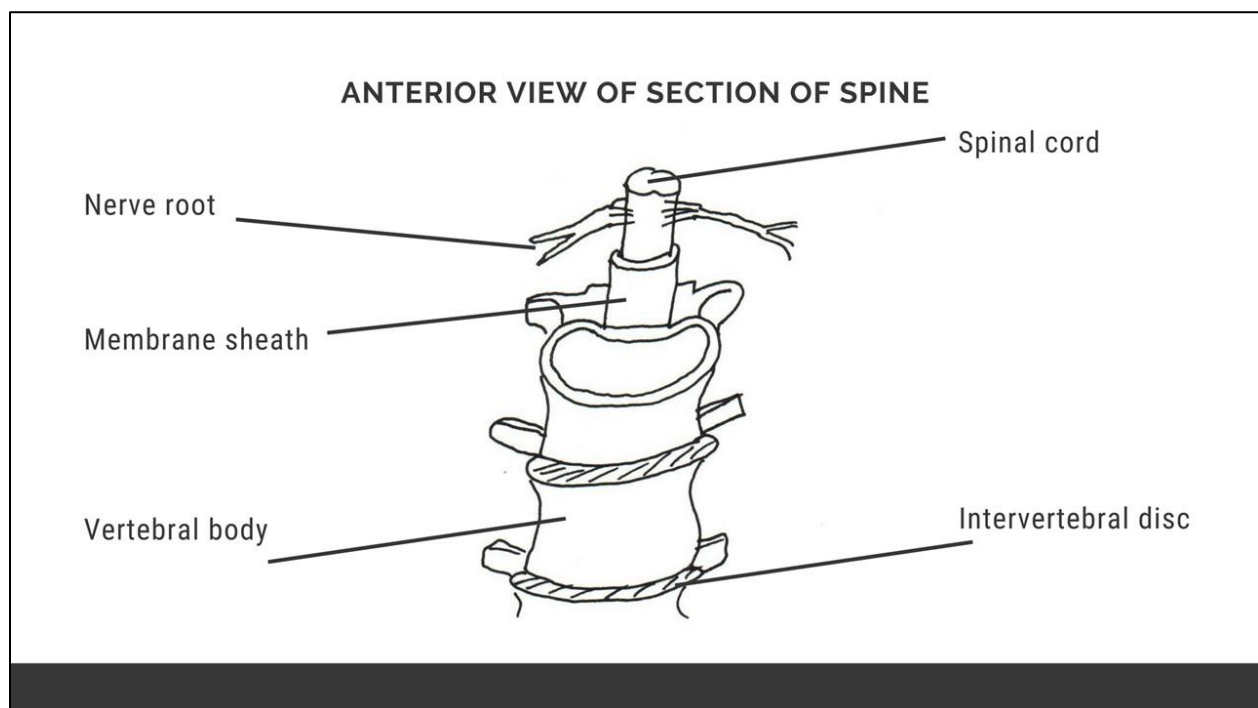
The neurotransmitters diffuse across the space and cause a response in the target cell. The axon will only send a signal when it is sufficiently stimulated to exceed its “action potential” and there need to be sufficient neurotransmitters at the synapse for one neuron to successfully transmit a signal to another.

For simplicity, in later diagrams, I will show neurons by a line with a circle representing the cell body, and a fork representing the axon terminal.

Exercise: *Imagine what a neuron would look like if we could magnify it by a factor of 1 million. The cell body would be the size of a beer barrel and the axon would have the diameter of a garden hosepipe that could be several kilometres long. The dendrites would be several metres long and could accommodate one or more axon connections.*

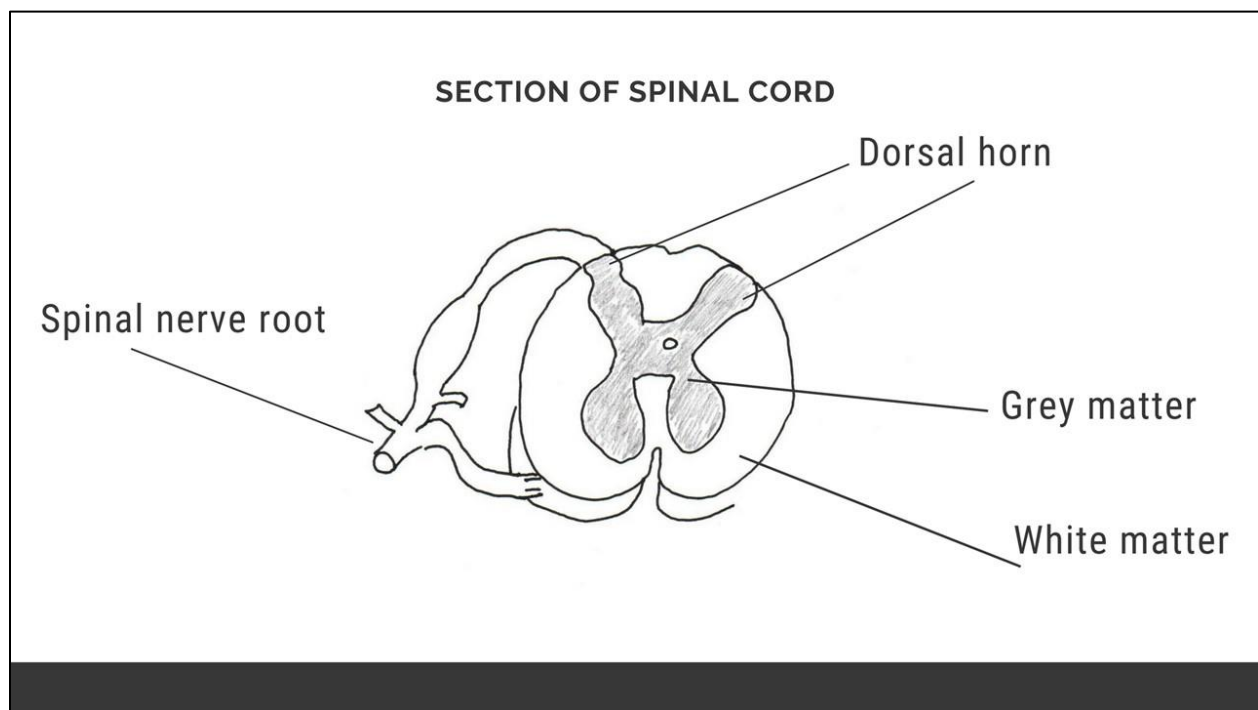
For convenience we divide the nervous system into Central and Peripheral. The central nervous system according to anatomical convention is the brain and spinal cord, the peripheral nerves are the extensions of the spinal cord that go to the outer parts of the body.

The spinal cord is enclosed and protected by the bony vertebral column and several layers of membrane. The spinal cord and brain are bathed in a liquid called CSF (cerebrospinal fluid) and the spinal cord communicates with the periphery by paired nerve roots.



There are 31 pairs of nerve roots coming off the spinal cord. The nerve roots contain Sensory and Motor nerve fibres. The sensory nerves bring information from the body to the brain, we call this afferent input. The motor nerves carry instructions from the brain to the body, we call this efferent output. For example the sensory nerves tell you that the hot sand is burning your feet, the motor nerves make you jump back to a safe place.

Exercise: To help visualise the anatomy of the spinal cord and nerve roots, imagine that your trunk is the spinal cord. Your arms represent a pair of nerve roots. Now imagine that you have 31 pairs of arms arranged symmetrically, one pair above another. Then imagine you are wearing a waterproof shirt and over that a sweater and over that a jacket, all with 31 pairs of arms. Your arms are the nerve roots. Now imagine that between your waterproof shirt and your arms and trunk there is liquid (CSF) slowly circulating around your trunk and down your arms.



Sensory nerve axons may be insulated (myelinated) or uninsulated (non-myelinated). Myelin is a fatty material that wraps around some nerve fibres and lets them transmit signals very quickly. In this horizontal section of the spinal cord we see white matter and grey matter. The white colour is due to myelin.

CONDUCTION SPEED OF NERVE FIBRES

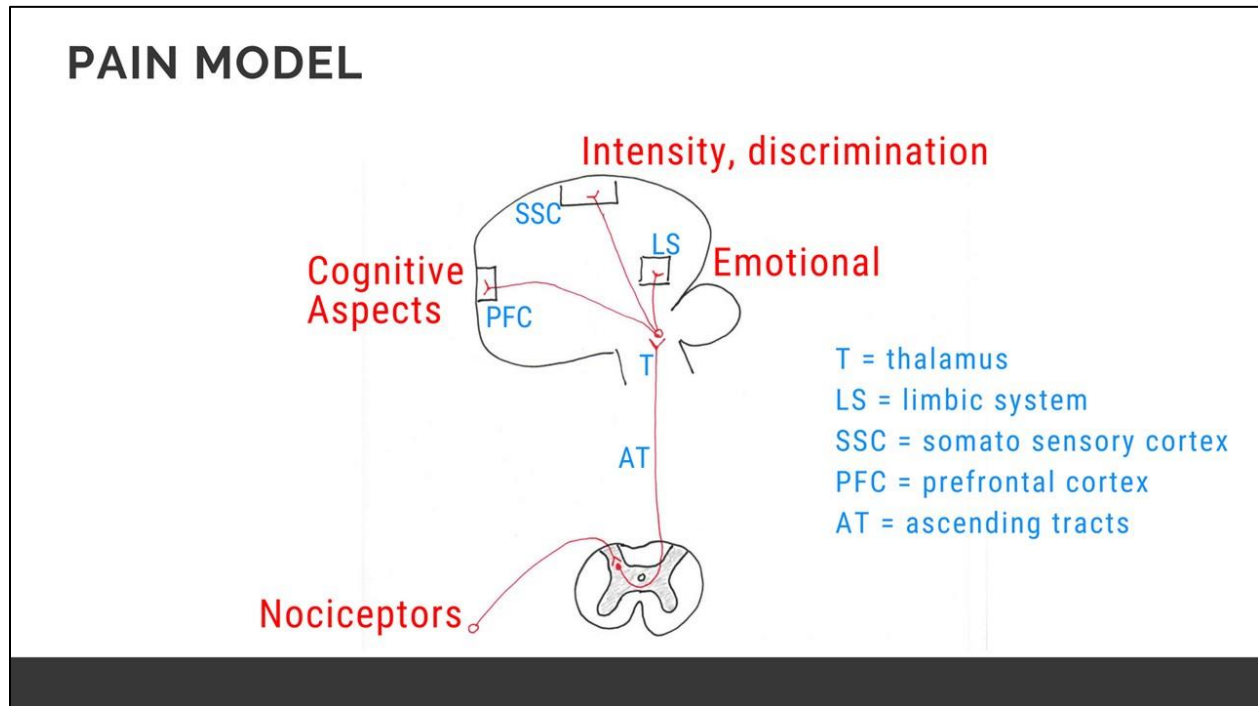
TYPES OF NERVE FIBRES

				
C	A-DELTA	A-BETA	A-ALPHA	TYPE OF NERVE FIBRE
0.5-2 m/s	5-40 m/s	35-90 m/s	80-120 m/s	CONDUCTION SPEED
0.2-1.5 μm	1-5 μm	6-12 μm	13-20 μm	DIAMETER
Non-myelinated	Myelinated	Myelinated	Myelinated	MYELIN SHEATH?
Pain: mechanical, thermal & chemical	Pain: mechanical thermal	Touch	Proprioception	INFORMATION CARRIED

For our discussion of acupuncture there are two types of sensory nerve fibre that we need to know about: C fibres and A fibres.

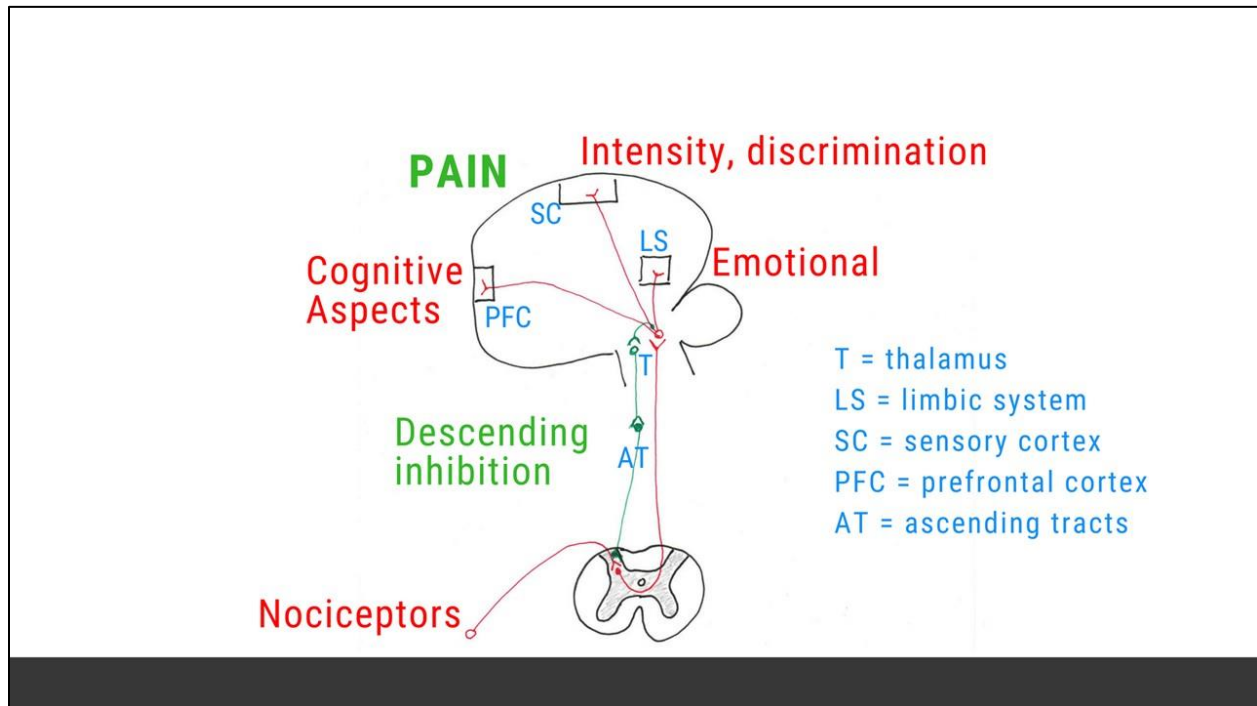
- C fibres are thin unmyelinated fibres that transmit pain signals quite slowly, at around 1 metre/second (approximately walking speed). This slow transmission speed explains why there is a small delay between hitting your finger with a hammer and feeling the pain.
- A fibres are myelinated (insulated) and transmit signals much faster.
- A δ fibres carry the sensation of acupuncture, at roughly the speed of a racing cyclist.

PAIN MODEL



This is what happens when we feel pain. When nociceptive sensory nerves are stimulated they send information into the dorsal horn of the spinal cord, from where the information eventually travels up ascending tracts to the thalamus at the base of the brain. From thalamus the information is passed to other parts of the brain. Mainly limbic structures such as amygdala and hippocampus which are concerned with emotion; “how do I feel about the pain”, the somatosensory cortex which assesses the intensity of the pain and where it is coming from, and the prefrontal cortex where cognitive decisions are made; “how should I respond to this pain?”.

DESCENDING INHIBITION



With a basic, acute pain, eg stubbing your toe, once the brain has processed the pain and decided on a response, the pain is no longer needed, and can be turned off or ignored. The brain will then trigger the process of descending inhibition as shown in the diagram.

When the pain is chronic, as the result of an inflammatory, ischaemic or degenerative condition the process is more complex. We know from PET studies that pain and fear cause the prefrontal cortex to light up. If the stimulation to this area persists for longer than six months the activation spreads to the lower limbic area of the brain and classical symptoms begin to appear:

- Disturbed sleep: leading to fatigue and disorientation
- Altered diet: in men craving for fat and salt, in women craving for fat and sugar. Often this leads to weight gain and lack of physical fitness, loss of libido and self-esteem.
- Hypersensitivity: to noise, light and smell.

With prolonged stress the hippocampus loses up to a third of its functionality and this shows as Memory Loss.

The effect of fear along with pain can lead to Post Traumatic Stress Disorder as the patient tries to reduce exposure to stressors. Social withdrawal and depressional tendencies are seen.

If the fear and pain continue, the cerebellar function becomes impaired and the patient complains of clumsiness and balance problems. Eventually homeostasis is affected, and the patient becomes feverish or chilly.

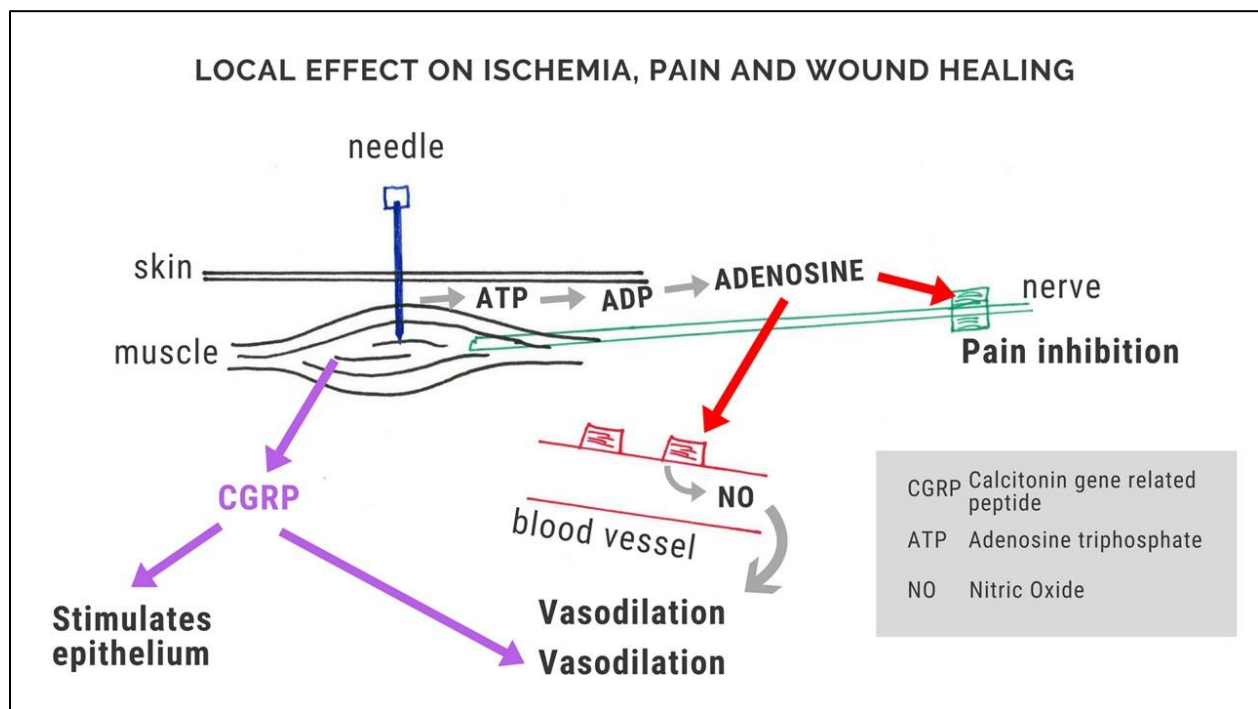
Typically one or more of the above symptoms will cause the patient to seek medical help.

HOW CAN ACUPUNCTURE HELP?

Using acupuncture, we can target the pain at various levels: the periphery, the segmental level and the brain.

PERIPHERAL

Looking first at the periphery. Most acupuncture points that we find in the body are in muscle tissue.

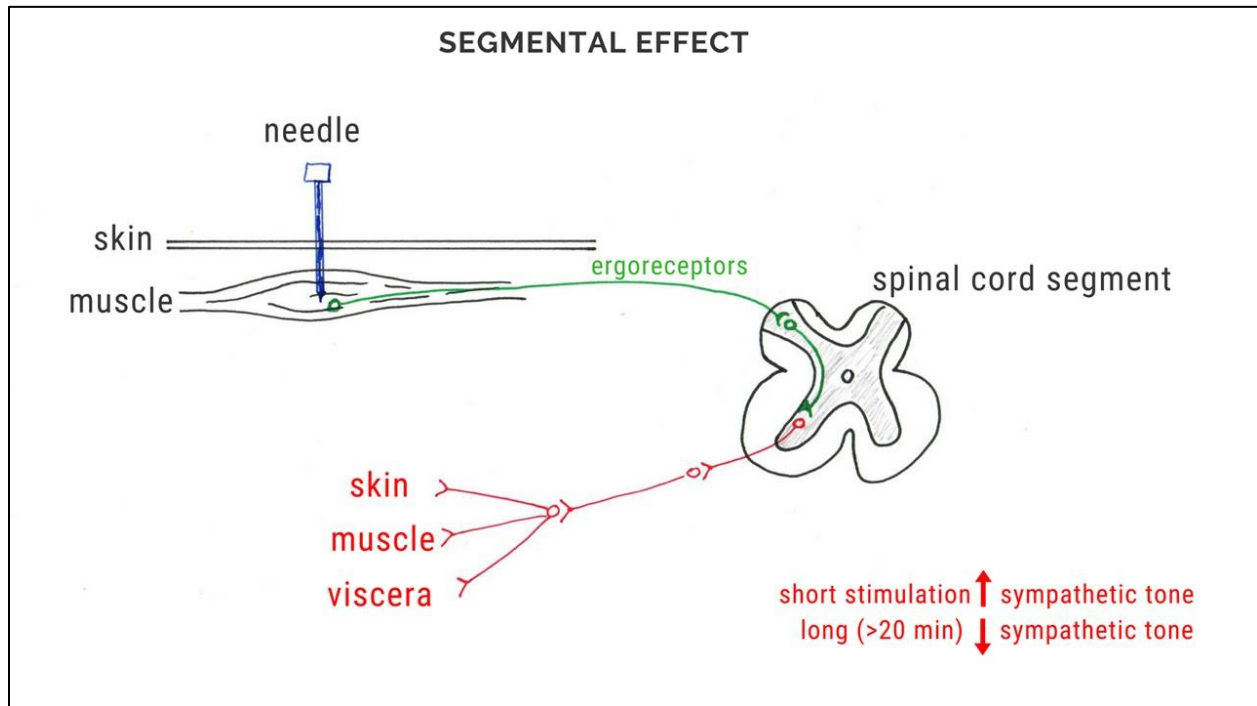


When we insert a needle through the skin ATP (adenosine triphosphate) is released locally. This ATP is converted into ADP and then into adenosine. Adenosine acts in two ways. First, it may bind to A1 receptors on the nociceptor afferent nerve and inhibit the signals from the lesion. This gives a small antinociceptive effect from the needle in the lesion site.

Secondly some adenosine binds to the epithelium of blood vessels and induces the release of NO (nitric oxide). NO is a potent vasodilator: it will dilate the blood vessels and increase local circulation. This is very helpful if we are treating local ischemia. We therefore have two effects at the peripheral site due to inserting an acupuncture needle. One is pain inhibition, the other is vasodilation.

As the needle moves deeper (usually) into muscle and is then manipulated by rotation or oscillation until “de qi” is felt (a sensation of heaviness), it will activate ergo-receptors in the muscle tissue to release CGRP (calcitonin gene related protein), another potent vasodilator. CGRP also has a trophic effect, it stimulates the growth of the blood vessel epithelium, an important part of wound healing. To optimise this effect we need to repeat the treatment 5 or 6 times.

SEGMENTAL EFFECT



There are two effects at the segmental level. Pain inhibition and a reflex effect that affects the tone of skin, muscle and viscera related to that level of the spinal cord.

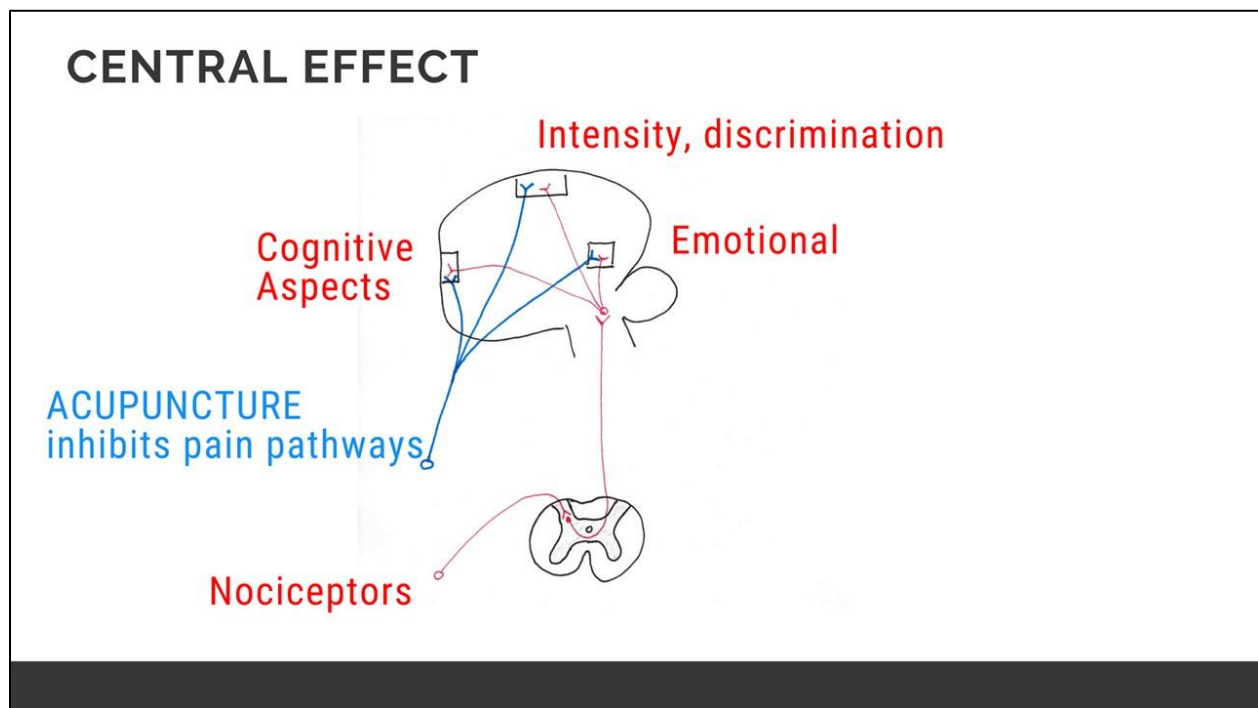
Inhibition. Both C fibres and A fibres enter the spinal cord at the dorsal horn, an area of grey matter that we can see in cross section. After entering the dorsal horn the C fibre neuron synapses with an intermediate neuron (in substantia gelatinosa), which in turn synapses with a neuron in an ascending tract that rises to the thalamus at the base of the brain. The ergo-receptors that we stimulate by manipulating the needle generate afferent input via A δ fibres that inhibit the intermediate neuron between the C fibre and the ascending tract, thereby reducing the intensity of the incoming pain signals. This phenomenon is similar to the “pain gate” model proposed by Melzack and Wall in 1965.

The stimulation also creates a reflex response that causes increased sympathetic tone in all the tissues that are innervated from this level. This includes the skin, muscle, connective tissue and even visceral organs.

Take the gut for example: a few minutes of acupuncture (abdominal wall segmental) will inhibit the activity of the gut by raising sympathetic tone; useful for treating diarrhoea. However, if stimulation is longer, say 20min there is a different response, the initial increase in sympathetic tone is followed by a decrease in tone that will last up to 18 hours. This can help with constipation. These long-term effects are dependent on the central control system that affect the sympathetic activity at the lower level.

BRAIN – CENTRAL EFFECT

Consider what happens in the upper part of the nervous system. The sensory signals after being relayed through the dorsal horn, ascend the spinal cord to the thalamus and from there to the higher centres of the brain.



As discussed earlier, we know from PET studies that there is a measurable increase in blood flow to the limbic system (LS), the somatosensory cortex (SSC) and the pre-frontal cortex (PFC) during painful stimulation. We also know that when we apply acupuncture, the blood flow to LS and PFC reduces.

The prefrontal cortex is concerned with analysis. It wants to know “What does this pain mean and how important it is to survival?” “Should I make it a priority to escape from this pain or can I ignore it for now?” If you are on a battlefield you might ignore the pain of a wound. But if you just tripped in the car park and hurt your knee, the pain might dominate your awareness.

The limbic system mediates the emotional response to pain. Within the limbic system the hippocampus is involved with memory processes and the amygdala with self-image. Together they affect behaviour. For example, during illness we may experience changes in sleep pattern, sociability, appetite, mood

We already know that acupuncture stimulates the release of endorphins. These opiate-like substances block the effect of pain in LS and in PFC. This process of “descending inhibition” is a global effect that the patient experiences as a feeling of relaxed well-being.

There has been a lot of research recently into the nature of this process and from a clinical perspective, how to optimise it. Endorphins act as neuromodulators and over a period of time they modify the activity of their target cells which is probably why the effects of acupuncture treatment build up over the weeks. It could also explain why a few individuals fail to respond to acupuncture: they may have genetic differences in their opioid systems that render them insensitive to the treatment.

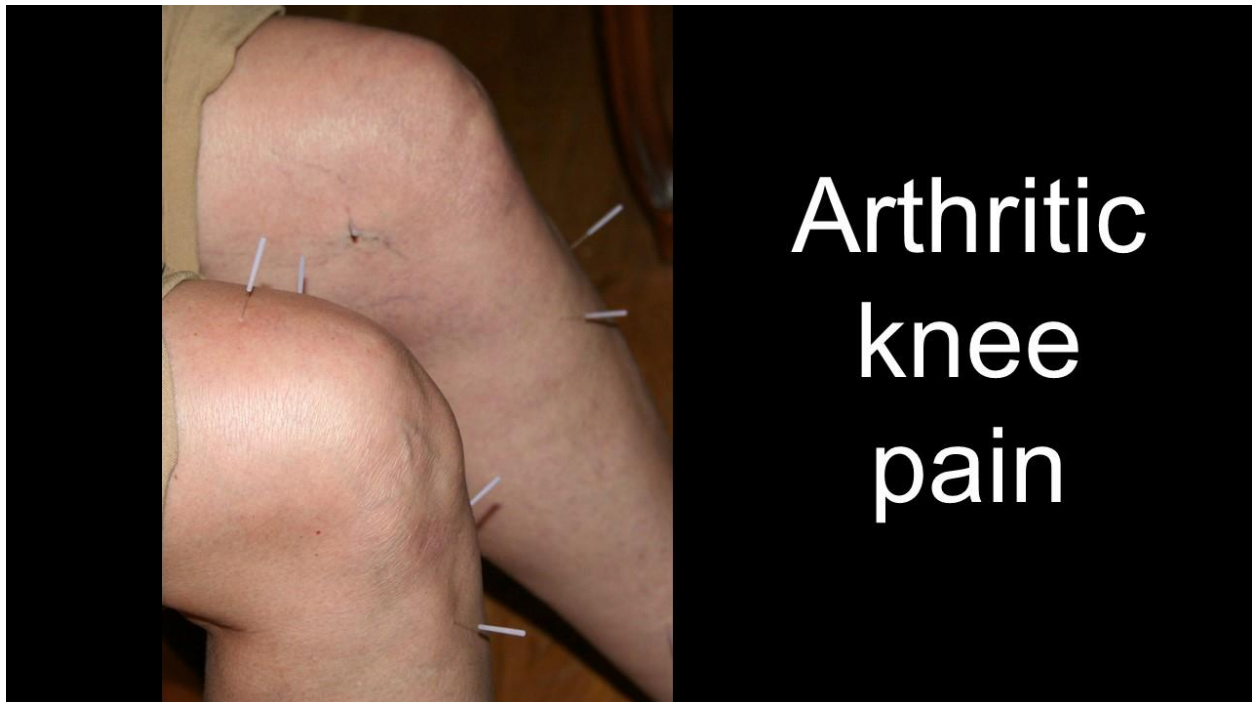
=====

CASE HISTORIES

SOME PRACTICAL CONSIDERATIONS

Clinical examples: It is important that patients have a diagnosis before receiving treatment. If pain is sending a message of an underlying condition and the therapist removes the pain without being aware of this, there is a medical risk of the unrecognised underlying condition getting worse.

ARTHRITIC KNEE PAIN



Here is an example of a typical treatment for osteoarthritic knee pain. The patient is active, in her 50's and unwilling to consider medication or surgery for her painful knees. She reports more pain in the right knee than the left. She wants conservative treatment that will reduce her pain.

The condition is mild but chronic (long term). I am treating the pain, not the arthritis. I selected points that were locally tender and would give a segmental effect at the level of the lumbar spinal nerve roots. The needles go through the skin into muscle, where they stay for about 20 minutes. By manipulating the

needles to elicit “de qi” my aim was to boost descending inhibition as well as having segmental and local benefits.

Looking at the right knee, there are four needles visible:

SP10, vastus medialis, segment L2/3/4

ST 36, tibialis anterior, segment L4/5

GB 34, peroneus longus segment L5/S1

The fourth needle is treating a local tender point in the sulcus between vastus intermedius and vastus lateralis.

But why does the patient get better? Why does the painful arthritic knee hurt less, or even stop hurting when all we have done is put a few inert, solid needles into the local muscles? By now you will be able to answer that question at a technical level. I would rarely go into such a detailed explanation in a clinical situation. Here is the simplified version: it is the explanation I give to my patients when they feel the unusual sensations that occur during a treatment, and they ask me to explain what is happening.

A simple explanation of the local effect

There are two obvious effects with acupuncture: a local effect and a general effect. When I put an acupuncture needle through the skin and into the muscle or connective tissue the first thing that happens is local dilation of blood vessels. The circulation increases as fresh blood comes into the area and there is a flushing effect, rather like the effect of exercise. There will be an odd sensation in the area of the needle: it is like a dull ache. This feeling will often block or reduce the pain of an injured area or an arthritic joint.

Local effects

- Increases blood circulation
- Reduces pain
- Speeds healing

A simple explanation of the central effect

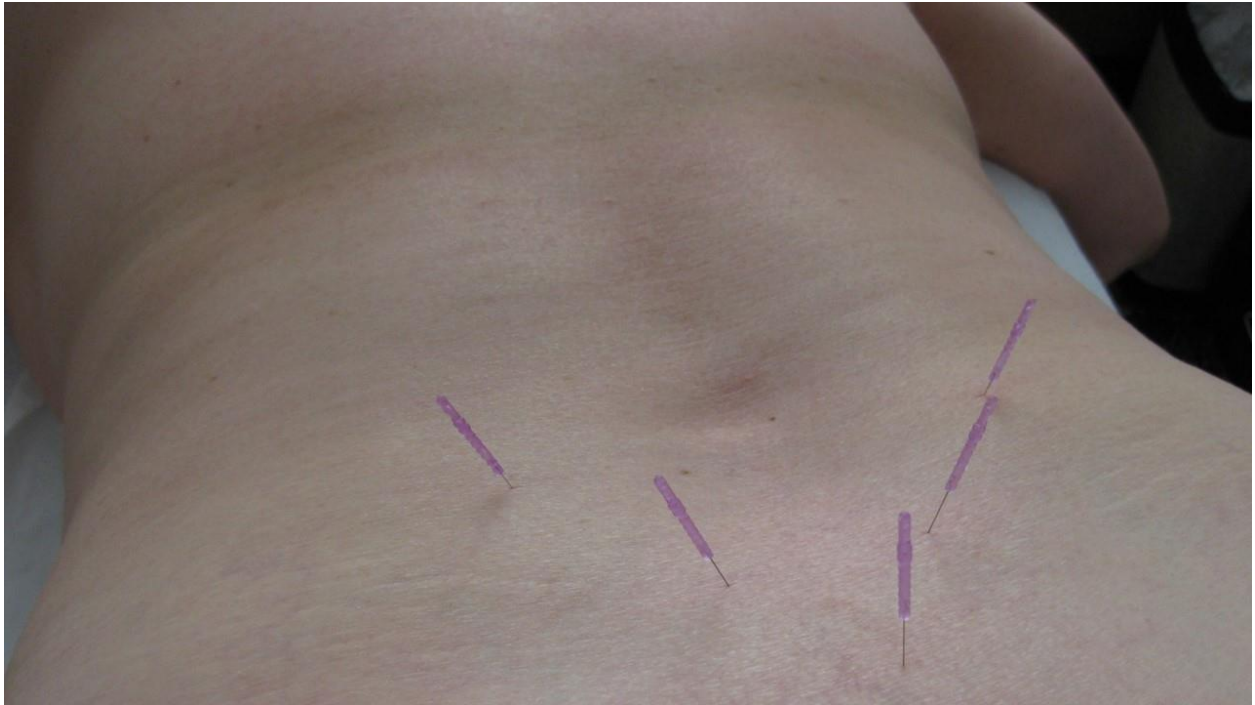
After a few minutes there is a general effect as some brain cells release endorphins; the body's own natural opiates. The endorphins enter the cerebrospinal fluid and circulate around the spinal cord. This has an effect on mood and on pain perception. The patient will typically feel cheerful even elated and their pain may reduce or feel less inconvenient.

Central effect

Inhibits pain perception in brain
via endogenous opioid pathways

LOW BACK PAIN

This delightful young lady spent too long sitting at her computer and is complaining of discomfort in the lumbosacral area. In this example the treatment protocol is simpler the needles are placed quite superficially to surround the painful area.



IRRITABLE BLADDER



Irritable bladder

It makes no difference whether the pain is coming from connective tissue or an organ. The dorsal horn is an important area clinically. Pain signals arriving here will travel through a series of nerves before ascending to the brain.

Segmental Effect

We can inhibit or stimulate the
internal organs using
somatovisceral reflexes

We can inhibit or stimulate internal organs using somat visceral reflexes

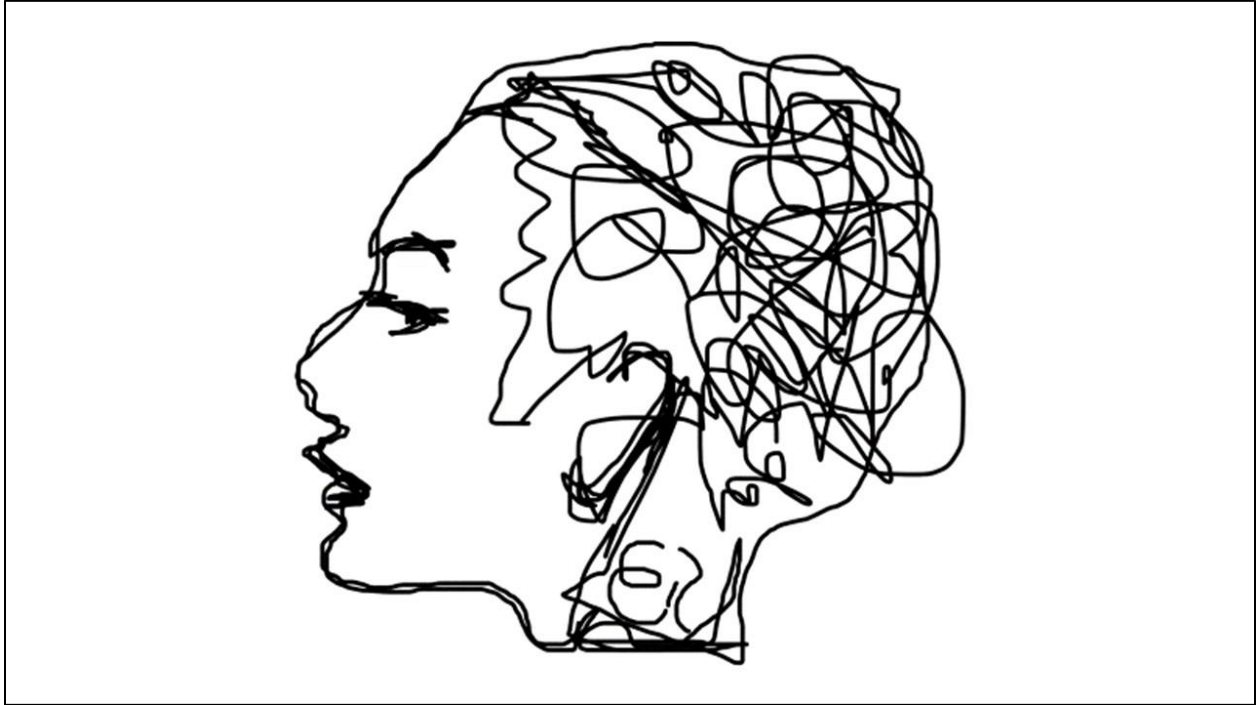
Innervation of bladder

Sympathetic: T11 – L2
Parasympathetic: S2 – S4

So, if the patient has, for example “irritable bladder” and we know that the sympathetic sensory nerves from the bladder enter the spinal cord dorsal horn at levels T11-L2 we can use our knowledge of dermatomes and myotomes to desensitise those levels.

In practice I might needle a point midway between umbilicus and pubis and another in vastus medialis to treat irritable bladder. But I would not be surprised if bladder symptoms were helped as a fortunate side-effect of treating knee pain as shown above.

INSOMNIA/ANXIETY



If a patient is not suffering from pain or injury but maybe has insomnia or anxiety, then I would want to focus on the “central” effect because we know that endorphins have a calming effect on the parts of the brain that process fear and emotion.

You can place an acupuncture needle anywhere in the body and produce a “central” effect, but some acupuncture points are known to give a stronger endorphin response than others.

Clinical observation has built up a knowledge of the most effective “points”. These tend to be:

- Near or in nerve bundles
- Where nerves emerge from deep fascia
- Muscle motor points
- Myofascial trigger points
- Perivascular plexuses of nervi vasorum

Most effective points

Even though we try to be very scientific in our explanations, these points are generally referred to by their Chinese meridian names, such as Liver 3 or Large Intestine 4. On the one hand this can be confusing to patients who might imagine they have a disease of the liver which I am treating with acupuncture, on the other hand the way the points are mapped on the body using the Chinese system is very convenient for recording treatment details.

In summary we have some useful clinical tools for treating pain and improving the quality of life for our patients. We can prioritise local treatment and/or systemic treatment. In practice it is common to use local points near to the painful area and one or two of these known distant points to strengthen the general effect.

DOSE

I have heard acupuncture described as a “dirty drug” due to its unpredictability. It can be challenging to know what “dose” of acupuncture to give a patient. We find strong and weak responders in the patient community. Unfortunately, we don’t know in advance which patients will respond strongly. The practitioner has to be alert for fainting or nausea at the first treatment. Subsequent treatments tend to be less dramatic.

At the other extreme there are some, around 1 in 10, who seem unaffected by acupuncture, this is also true for laboratory rats, a small percentage do not respond to acupuncture. Some researchers suggest that this is due to a genetic variation.

Assuming that the patient has not reacted adversely to the first treatment we can increase the dose as follows.

TREATMENT DOSE - HEALTHY PATIENT	
Mildest	Short duration, subcutaneous, no manipulation, one or two needles
Mild	Short duration, into muscle, invoke “de qi” once, two or more needles
Moderate	Longer treatment (20 min), several “de qi” manipulations
Stronger	As above, with peripheral points added
Variable	Electroacupuncture: can vary from mild to very strong

As a general rule the needle should be manipulated until the patient reports the sensation of “de qi”. If the manipulation is too strong and the treatment creates pain it will not be as effective and may even make the patient worse.

As discussed earlier, we know that chronic pain can induce central sensitisation and for this reason a healthy person will respond differently to acupuncture treatment than someone with chronic mild or severe pain. This table suggests how treatment should be modified according to the status of the patient, from healthy to chronic sufferer:

TREATMENT DOSE – UNHEALTHY PATIENT			
	Healthy	Mild Chronic Pain	Severe Chronic Pain
Light needling without de qi	-1	-2	+3
Short duration with de qi	-2	-3	+1
Longer duration with repeated de qi	-3	+1	+2
Painful	+1	+2	+3

Minus = reduced pain, Plus sign = increased pain

In practice this means that when treating a delicate patient with fibromyalgia or migraine, light is best. Anything stronger makes it worse.

A single treatment will result in the release of neurotransmitters at the synapses of the descending inhibition system. Five or six treatments will affect the genomic expression and increase the quantity of neurotransmitters released at the synapses. This will re-educate the system and have a longer lasting effect.

In summary: The stimulation should be as strong as possible, but not too strong. Repeated treatment gives long term effects.

ELECTROACUPUNCTURE

There is disagreement within the WMA community over the clinical need to use electrostimulation. It is convenient for researchers who like to measure everything that they do to their experimental rats, but clinically do we need that level of control for our human patients? This is a topic that tends to polarize opinion.

Electrical acupuncture at 80Hz frequency has a similar effect to shallow needling: local circulation is increased, and pain is reduced. It has a calming effect on the limbic system.

Electrical acupuncture at 2 Hz frequency has a similar effect to deep needling into a muscle it strongly enhances the deactivating effect of the descending inhibitory system. In practice we alternate rapidly between the two frequencies in an attempt to get the best possible response.

From a patient's perspective, electroacupuncture has a more powerful effect although the side effects can be stronger too, local pain for a day or two before remission of pain is not unusual, although some patients fall asleep during treatment and are cured of pain surprisingly quickly.

TRIALS, PLACEBO AND SHAM

There is one final aspect that I must mention. There have been many trials that show an effect due to acupuncture but also show a similar effect from sham acupuncture. Newspapers carry headlines that say "acupuncture is no better than sham"

This is a topic that resurfaces at every conference. How can we do a randomized, double blinded trial of acupuncture? What can you think of that looks and feels like a needle but isn't a needle? How can you set up a trial so that patients and therapists are blind as to whether or not a treatment by needle is given? As we saw earlier there is a global effect from needling anywhere and the local effect doesn't always need strong stimulation to occur; light touch is enough for some

people. This is an unresolved problem and it is very important to English doctors who want the NHS (National Health Service) to pay for Acupuncture treatment. The NHS will not pay for treatment that is unproven. At the moment, proof that is acceptable to the NHS is almost impossible to get.

Recent advances in PET and fMRI are expanding our knowledge of how different parts of the brain work. It is known that the activity of the insula increases during emotional processing. The insular cortex is bilaterally located deep within the lateral sulcus that separates the temporal lobe from the parietal and frontal lobes of the brain. The anterior insula is the centre of interoception and regulates the introduction of subjective feelings into cognitive and motivational processes. Of relevance to acupuncture is the observation that “real” acupuncture increases activity in the insula whereas sham acupuncture does not. This raises intriguing possibilities for future research.

IN SUMMARY

- Acupuncture can be explained scientifically
- For many patients it is an alternative to surgery
- For many patients it can be a low-cost alternative to analgesic and anti-inflammatory drugs

Many of the effects of Acupuncture can be explained scientifically, using our current knowledge of physiology and anatomy.

For many patients Acupuncture is an alternative to surgery.

For many patients Acupuncture can be a low-cost alternative to analgesic and anti-inflammatory drugs.

We are probably all aware of the pharmaceutical treatments commonly used for treating chronic pain. Analgesics, anti-inflammatories, antidepressants are all used routinely to help patients cope with their pain. The problem, apart from cost is the possibility of side effects.

This is one reason why acupuncture is so appealing to medical researchers. To be able to treat pain without unwelcome side effects and at low cost is a tantalising possibility.

REFERENCES

- 1 James Morss Churchill Treatise on Acupuncuration:
<https://www.gutenberg.org/files/50985/50985-h/50985-h.htm>
- 2 Mann F: Acupuncture, How it works and how it is used today. ISBN 1-898107-10-6
- 3 Adrian White, Mike Cummings, Jacqueline Filshie: An Introduction to Western Medical Acupuncture, ISBN 978-0-443-07177-5 Publisher: Churchill Livingstone
- 4 Lundeberg T 2006 Some of the effects of acupuncture in knee pain may be due to the activation of the reward system. Acupuncture in Medicine 24 (Suppl) 67-70
- 5 Lundeberg T 2013 Update on research findings at 2013 BMAS Scientific Meeting