Academy of PHYSICAL MEDICINE

Broadcast Summary

Shockwave and Vibration Therapy
With Tim Watson

Tim Watson
- Professor of Physiotherapy at the University of Hertfordshire
    - His sole responsibility at the university is research
- Has been a Physiotherapist for over 40 years.
- [See Tim Watson Pts. 1+2 for more information about him]

The Broadcast
- Demonstration of specific machines
    - Unbiased discussions of usefulness etc.
    - Tim doesn't endorse or promote any particular machine.
- Research-based reviews of the machines.
- Information available at www.electrotherapy.org
    - Soon to contain reviews of products

Shockwave Therapy
- Two versions of shockwave: Focused and Unfocused.
    - Focused: energy is more concentrated as it leaves the applicator.
        - Most probably suited to a specialist practice.
    - Unfocused: energy coming from the applicator diverges in the tissue, making it less concentrated and non-destructive.
        - Kit such as a radial shockwave machine.
        - Such a machine would be the appropriate type for clinic.

- Shockwave machines previously stood on massive pedestals.
    - Now, getting smaller and they're getting cheaper.
- 5 years ago, estimated cost would have been £25,000 per machine.
    - Now, the price is way under £10,000.
    - Direct, cheap imports from China can be poor and have short lifespans.
- No need to spend £25,000 on large machine when a small unit can give you clinically effective evidence.
- Poor/Good quality can be accessed by the lifespan guarantee.
    - 500,000 shocks or quality machines may take 3 million before maintenance

needed.
    - Cheap to buy, does not necessarily mean cheap running costs- look for balance.

- Mechanical Therapy as opposed to Electrotherapy.
- Shockwave Therapy delivers 10/20 etc. hits a second.
    - In comparison, ultrasound delivers mechanical energy perhaps a couple of million times a second.
    - It's deliberately sending a mechanical pulse into the tissue
    - Mechanically provoking tissues or wounds into responding.
    - Can be uncomfortable during and around treatment
- E.g. Routinely used to break kidney stones.
    - Researched late '60s- early '70s.
    - Although successful, the treatment was breaking up bone and destroying musculoskeletal tissues.
        - Problem resolved with toned down power- more power just not needed.
        - Pulse remains 'uncomfortable' but won't damage tissues.
    - In short, the treatment is useful for chronic problems.
        - E.g. chronic Achilles, chronic plantar fasciitis
    - Would be used in conjunction with exercise and some manual therapy work such as postural etc.
    - Frequency does not change outcome of the treatment; however, number of hits is important.
        - Best evidence at the moment is pointing very clearly at around 2,000 shocks.
        - Once a week, conversely to everyday when carrying out ultrasound.
    - Deliberately winds tissues up.
        - Making it more acute and more responsive.
    - Allows you to use the acuteness as the driver to get you through the repair sequence.
    - Any immediate pain relief is a by-product.
- Conditions: The Tendinopathy type problem
    - Plantar Fascia, Achilles, Patellar Tendinopathy
    - Greater Trochanteric Pain Syndrome (only non-classic Tendinopathy)
    - Medial and Lateral Elbow, Supraspinatus, Biceps and Tendons
- A few studies have been carried out on the effect on calcification.
    - Success dependent on size of machine
    - Perhaps not practical without having the really 'high powered machines'.
- There is also attempts to try the therapy with fractures that won't mend.
- Also being used on muscle problems as opposed to just tendon problems.
    - Early research in this field is looking good.
- Treating erectile dysfunction.
- Children with cerebral palsy with massively spastic muscles have seen some really good effects.
    - Would have to be a long-term treatment protocol.
    - Treatment once a week/fortnight can have massive impacts on quality of life.
        - Manageable; ten-minute session each week.
    - Long way into the future, smaller units may allow this to be home-managed.
- Use in dental treatments also being tested.
- Overall, strong evidence-based research behind Tendinopathy with much of these ideas

developing interestingly.

- Charges:
    - Some practitioners charge hundreds for sessions and request upfront payment.
    - Not necessarily needed, you can work on the premise that you may be the only practitioner with the kit in the area.

- Contraindicators:
- A lot of contraindicators developed from high-powered focus shockwave therapy.
- If you apply too much energy to a cemented implant, it has the potential to loosen it.
    - Knee replacements etc.- probably wouldn't be affected by standard clinic machines but better not to risk it.
- Osteoporotic patients are not a contraindicator.
    - Papers on this have been limited.
    - For generalised osteoporosis and BMD issues, a vibrating platform has got better evidence than shockwave.
- Hip problems? Capacity to irritate a bursa?
    - Definitely can irritate bursa
    - Would be used on unresolved chronic bursitis as opposed to acute.
    - Important to warn patient that treatment is not subtle and doesn't make everything better immediately.

Unresolved Plantar Fasciitis as an example

- Provocative Treatment
- Evidence from cases would estimate a treatment a week for up to 5 weeks as 'usually sufficient'.
    - 2,000 shocks a session.
    - Treatment can take as little as 10-minutes.
- Combine with eccentric loading.
    - May not have worked pre-shockwave treatment but in conjunction there is more chance it will work.

Patellar Tendinopathy as an example

- Practitioner explains that treatment won't be comfortable and how it works.
    - Check contraindications.
- Option to get the patient used to the feel by testing on a non-damaged area.
- Set at the kind of power level which would be used clinically.
- If machine is used without the silicon, apply some gel. (can be standard ultrasound gel etc.)
    - Aids energy transmission into the tissue.
    - Makes the treatment more comfortable.
- Treat on couch ideally with 15/20 degrees flexion of a knee over a pillow.
- Locate the most aggravated part of that patellar tendon.
- Focus on the most obvious problem but share across whole area and deliver 2000 shocks.
- Treatment is unaffected by any number of breaks or stoppages- reaching the required hits is more important than the length of time it takes to get there.

- Machines often come for suggested programs for various ailments.

- Evidence behind varying 'number of hits etc.' is limited.

Manufacturers and Equipment

- E.g. Zimmer
- EMS an example of a distributor.
    - Distributors probably safest option when purchasing as they will give you:
        - A: the service
        - B: the quality guarantee
        - C: Replacement guarantee
        - D: Servicing of the kit.
- Can buy straight from China or eBay but does not guarantee the above.
- Different applicator heads can change concentration.
- Standard head is approximately 12-15mm across.
    - Used for most areas, even fingers, wrists and thumbs etc.
- Larger applicators tend to be used for muscle.
    - More practical.
- Smaller applicators can be approximately 6mm.
    - Can be pretty wicked- less commonly used.
- A lot of distributors offer lease as well as outright purchase.

Research

- 2000 hits:
    - A lot of research behind the number of hits dealt.
    - Research began much lower at 100-500 hits.
    - The number was steadily increased to where it is now.
        - Likely, that certain people deal even more hits per treatment.
        - At some point, there must be a number of hits which provokes the tissue too much.

How does the machine actually function?

- A tube down the middle is filled with oil and there's a ball-bearing and firing piston.
    - The ball bearing is blasted down the tube and hits the end, which is the contact with your skin (the hit).
        - Here is where the shockwave is generated, transmitting the energy into your tissues.
- A sleeve can be attached to reduce irritation, which doesn't affect the treatment outcome.
- When there is no sleeve, hygiene-wise, it's important to clean with an alcohol-based wipe.
    - On wounds, a sterile barrier between the wound and machine would be necessary.
- Most of the time, hygiene precautions only need to be the same as for an ultrasound treatment head as you don't often tend to be in contact with open tissue.

Key priorities when purchasing:

- Control over the machine
    - Ability to vary how powerful the shock is and amount of energy pushed into the tissue.

        - Ability to vary frequency.
            - Not in terms of clinical output but rather patient acceptance.
- Balance pricing in terms of product but also replacement parts and maintenance.
    - E.g. Replacement heads cost approx. £350.00

Muscle Stimulation

- Similar to TENS
    - TENS designed to stimulate the sensory nerves.
      (1) Muscle Stim is very efficient at stimulating motor nerves.
    - Neither exclusively carry out these functions.
- E.g. Applying a TENS machine to a muscle such as the forearm flexors.
    - Turning up the settings even on a TENS can fire the motor nerves.
    - The machine forces the muscle to fire by firing the motor nerves.
- A concept that can be applied to erectile dysfunction etc.
- Muscle stims are bigger and more expensive than TENS.
    - However, they add patterns to the contraction process, which aren't possible with TENS.
    - Bringing a contraction on, holding, letting go and then rest.
    - Work muscle at higher frequency (e.g. 30 hertz) then stimulate at low frequency (e.g. 4 hertz)
        - Maintaining 'tingling' low frequency allows local blood to flow.
- (Demo machine in video supplied by Win Health)
- Safe to use on necks and trigger points.
    - Perhaps not so much on the front of the neck but rather the back.

- Damaged muscle:
- Treatment would ideally take place each day for 30 minutes.
- No need to see patient in this time, possible to lend them machine for a fee and they can 'treat themselves'.
    - Takes very little time to teach patient how to set up the machine for treatment.
    - Treatment could be carried out at work, whilst watching the TV…
    - Win-win- practitioner is earning money without working and patient gaining good clinical results.
- Evidence suggests this needs to be carried out alongside exercise and not as replacement.
- The patient works with the machine (potentially working against contraction/extension etc.)
- As implied, this machine can be used domestically.
    - Basic price could be £30.00.

- Benefits of Muscle Stim with MS and Parkinson's etc.:
- Previously, it was argued that you should never use muscle stim with such patients.
- Now, there's a substantial body of evidence (stroke) that says this facilitates recovery.

Vibration Plate

- Began through use in the gym, supposedly enhancing the effect of your exercise when carried out on the plate.
- Has steadily crept into the therapy world, from those wishing to reduce recovery time after

exercise to the elderly who wish to improve their balance.
    - Large range of patients: stroke, cerebral palsy, Parkinson's, reducing risk of diabetic neuropathy.
- (Demo machine in video supplied by PCS Global)
    - Portable machine costing £1,200.
- Many clinic machines have bars for the patient to hold onto.
- Vibrations vary: laterally or vertically.
    - Vertical vibrations are the ones that people get the best strength changes from.
    - Lateral Vibrations seem suited to improving balance.
- Vibrations can be around 2/3mm.
- Certain clinics now have an exercise/gym area which entail a fee and then the patient can use the vibration plate and incorporate it into their treatment.
- There is also a long-term benefit regarding obesity, helping sustain weight loss over a longer period.

A 'different variation' of Ultrasound

- From a well-known manufacturer called ENRAF in the Netherlands.
- An ultrasound machine with a fairly standard treatment head.
- Using a solid gel pad, this type of machine holds the treatment head in place at the ideal 90-degree angle.
    - Delivers the ultrasound which is decided by the practitioner.
    - Do not use squirty gel with this machine as it goes straight into the tube and hampers the machine.