



Robert Fullick DSM

Swedish massage and it's effect on the body and a study of Swedish massage for Children undergoing Hematopoietic Cell transplantation and use of Massage for Improved symptom Management.

Massage has been around for thousands of years and is well recorded throughout time and has changed functions throughout history, as a form of medical treatment, to purely a pleasurable form of touch and into the diverse range of massage techniques that are functioning in today's society. The ancient physician Claudius Galenus (131-201 C.E) wrote extensive use of massage in his book '*De Sanitate Tuenda (Hygiene)*' he wrote that massage was 'to soften the body'(R.N.Calvert.,2002) before exercise;

'and the rubbings should be of many sorts, with strokes and circuits of the hands, carrying them not only from above down and from below up, but also subvertically, obliquely, transversely and subtransversely.'(R.N.Calvert.,2002).

So even two thousand years ago, massage had developed into a well practised and define routine – not just a random stroking of the skin that some perceive massage to be.

This also follows the use of various oils to aid the benefits and effects of massage which was recorded in the Classical Greek world by Aristotle, Hippocrates and Philostratus and Lucian and modern trials have replicated these claims to give providence to the writings, with Aristotle writing in the fifth century B.C.E in Athens. Such was the support of oil use (Olive oil) especially for athletes, that Athenian athlothes (sponsors) provided free oil for use by competitors. The rub, or massage (from Ancient Greek verb masso=give assistance operations) was given lightly and then progressively harder – well aware that this acted on the metabolic rate and warmed muscles to better aid the athlete. This was deemed so important that Philostratus in his book '*Gymnastics Epistolai*' writes instructions on how to give a massage and indeed, specific people were trained in anatomy in order to carry out this role.

This use of what we today know as 'massage' continued through the ages, as the French Physician Clement Tissot, a leading figure in the history of massage wrote in the 1770's the use of 'friction, rubbing, kneading and alternate compressions.' (R.N.Calvert., 2002). So through various civilisations throughout time, whether as healing or for use as an aid for athletes, massage has evolved and been a part of society and its benefits been well documented and examined.

From out of the various modes of massage, Swedish Massage has taken rise as one of the most popular throughout the world. Again, it was developed as medical gymnastics in the 19th century by the Swedish Psychologist Pehr Henrick Ling. By using methods from The Romans and the Ancient Greeks to enhance performance. The Dutch practitioner Johan Georg Mezger was the first to give the movements of Swedish massage its French names and developed the massage into how we

know it today.

Although the names and sequences have developed and the initial medical use was changed to allow people to enjoy massage for relaxation as well as for medical purposes, Swedish massage has a place in the medical world on its effects on the body.

The natural place to examine the effects of Swedish massage are firstly on the Integumentary system, where the initial effects are first found. The skin, having so many receptors of temperature and pressure is the first system that feels the benefits and effects of massage.

By increasing blood flow throughout the body, the blood vessels dilate and help to ease congestion throughout the body, warming tissues and helping deliver vital nutrients to the skin and also taking away toxins. It can also help with the elasticity of the skin and 'removal of dead skin cells' (www.wholepersonhealth.com).

Through the touch of the skin, messages are sent to the brain which in turn release their own messages and engage other systems of the body.

With the initial touch, the messages are sent to the brain where the nervous system as a whole is affected. The limbic system often responds by interpreting massage as relaxing and so one of the biggest effects that massage has, is to create a feeling of relaxation, calmness and even pleasure and can reduce stress levels and associated hormonal imbalances to bring homeostasis back to the body. As well as providing relaxation, the messages received through the nervous system regarding pain control are also affected and through the pain gate theory (developed by Willem Noordenbos), massage can effectively block out or reduce the painful nerve messages, especially in the case of back massages, where 'the peripheral nervous system has centres at which pain stimuli can be regulated.' (Kandel,E.R,1981).

Because the body likes the patterns and sameness that Swedish massage incorporates, after a while, 'it does not take as much stimulation to produce the effects' (Scottish Massage Schools, *Handout 3*, page 13).

Like an interconnected wiring diagram, the messages which travel through the nervous system, ultimately end up at the brain whereby it engages other body systems, acting on the sensory input from the massage strokes.

An important link between the nervous system and the endocrine system exists, whereby one receives the stimuli and the other produces a chemical reaction to this through the production of hormones-cortisol, endorphins and chemicals throughout the body's organs. Swedish massage's effects on the endocrine system are important due to the actions that the endocrine system produces, through its control of hormones in relation to stress, growth, reproduction, metabolism and energy use. Massage has long been associated with its calming effects and feeling of wellness and balance and it's through its effects on the endocrine system that this happens. By the release of the hormone cortisol, brought about by the repetitive, calming strokes of massage, the body is given a chemical signal to relax and counteracts the feelings of panic and stress. Again, through the strokes itself, as seen with the integumentary system, circulation is aided to those parts of the endocrine system, giving them improved nutrient delivery and waste removal.

Massage acts then, directly on the parasympathetic nervous system, producing an overall feeling of relaxation and is a useful tool,

'encouraging balance also encourages a balancing in this system.' (Scottish Massage Schools, *Handout 4*, page 11).

Because of the close link between the endocrine system and hormones, it follows that this chemical stimulation of the body's organs affects the reproductive system and massage can affect this – even indirectly through the massage itself. By receiving better blood flow and general helping to keep the body in a state of balance, the body and mind can benefit from the psychological and physical benefits of massage to aid in reproduction. One of the biggest problems is stress and the chemicals which are produced and their effect directly to the reproductive system. As this clinical trial of 168

women undergoing IVF treatment shows, after completing questions on stress levels and measuring changes of adrenaline and such in urine there was;

'In women with successful treatment, lower concentrations of adrenaline at oocyte retrieval and lower concentrations of adrenaline and noradrenaline at ET, compared with unsuccessful women, were found....The significant positive association of adrenaline concentration with pregnancy and with depression suggested that this adrenal hormone could be one of the links in the complex relationship between psychosocial stress and outcome after IVF/ICSI.' (Smeek,J.M.J, 2004). So by using Swedish massage, its effects are more deep rooted and long lasting than most people would think and so it clearly shows that massage can indirectly affect other parts of the body without direct touch.

Another system that is almost indirectly affected by massage is that of the Urinary system. When thinking of the urinary system as a whole, it is not simply the end waste product but the system that produces this – kidneys and the hormones controlling water balance – again, a fine balancing act between the endocrine system and the urinary system. Different massages used in Swedish massage can have a greater affect – for example 'there is usually an increase in the output of urine particularly abdominal massage as that stimulates the renal plexus' (Scottish Massage Schools, *Handout 5, page 25*).

The same is true with performing a back massage, there is a reflex action which helps to improve the movement of fluid from the interstitial compartment to the systemic circulation. This sudden increase in blood flow to the area results in increased urine output to counteract it. Massage then, 'promotes the excretion of nitrogenous wastes and other ions' (Premkumar,K,2004). By increasing the flow to the kidneys, there is an improvement in nutrients to the area and waste materials can be removed quicker.

By centripetal pressure over vessels and glands, massage also has benefits on the lymphatic system, thereby helping to control toxin build up, fluid imbalances as often found in less active lifestyles and overall immunity. By increasing the flow of lymph in the body, massage helps the production and distribution of vital T-cells, helping the body to fight off infections. It has been documented that Swedish massage produced 'an increase in natural killer cells and lymphocytes, serotonin and dopamine' (Corbin,L.,2005). By aiding the flow of fluids, proteins and electrolytes through the body, the lymphatic system removes excess fluid, fat, and 'produces white blood cells which marshal lymphocytes at infection sources'(Scottish Massage School, *Handout 4*). Thus Swedish massage has an important role to play in helping to speed up the process which in turn helps the body return to a normal balance.

Within all these main systems, there is also the digestive system, not readily thought of as being massaged directly, but as seen with other bodily systems, the effects are wide spreading as in a knock-on effect and engage other systems. By means of massage, the nerves, involuntarily controlled are stimulated by the effects of massage and subsequent chemical releases of enzymes and can help in digestion and aid with peristalsis, helping to excite the nerves to function better and to aid digestion and get rid of unhealthy toxin levels – especially associated with stress and its associated problems of constipation or over active muscles causing diarrhoea

As the massage also increases its effects on the lymphatic system, within the digestive system, digested food is helped to be absorbed by the increased blood flow and lymph capillaries, thus removing the harmful toxin produced from digestion itself. As well as removing toxins and increasing function, the action of the muscle tissues can also help in toning the abdominal muscles by its increased blood flow where 'good tone and strength in abdominals help in defecation' (Scottish Massage Schools, *Handout 5*).

No matter hat part of the body is being massaged, with the release of cortisol into the body, as seen, massage can produce calming and relaxing effects. This relaxation can help to slow down the

respiration rate, thus taking the pressure off the respiratory pressure as it will make less demand for oxygen and allow the increased blood flow to flow through the body more effectively, especially to the lungs. With the relaxing effects of massage, vital chemoreceptors are affected, balancing the body by the better breathing rate in order to inhale oxygen and exhale carbon dioxide, again bringing the body into better balance.

By having a better breathing pattern, with relaxed muscles and more efficient breathing, the respiratory system and its muscles can become more toned and stronger, allowing better movement of the ribcage and providing better posture.

As examined, with massages, blood flow is increased throughout the body and this is done by the cardiovascular system, whereby fresh oxygen is pumped around the body to all the major organs. So any increase in the hearts output will effect all the systems of the body. With the increased blood flow, heat is also generated in the area being massaged and also as a reflex action, it affects nearby organs. In reviews, the effects of massage on the cardiovascular system and its function of pumping blood around the body and on the make-up of blood and plasma has also been examined;

'whole-body massage induced an acute decrease in blood and plasma viscosity and haematocrit in both ankylosing spondylitis patients and healthy subjects. These findings were explained by massage causing a 'decrease in sympathetic tone' (Callaghan,M.J.,1993).

So it is quite evident that massage not only produces a slowed heart rate through relaxation, but also changes the pressure on the heart, arteries, and surrounding organs by the relaxation of the sympathetic nerves to increase blood flow throughout the body, delivering vital nutrients and taking away harmful toxins.

The effects of massage on the skeletal system are two-fold – that it aids the muscles and tendons which attach to it, especially after injury, in order to improve circulation and help with scarring, but to the actual bone itself, massage can aid in the secretion of new synovial fluid, through increased mobility to help with joint health. The increased circulation around the body, helps to remove waste and improve nutrients to the bones, helping in their formation and regrowth. Massage can also help with maintaining joint mobility, especially after injury as massage can create a mobile scar and break down adhesions which may form in joints, limiting movements and altering the skeletal position in that area. So through massage, the skeletal system can benefit, especially around areas of injury and also as a preventative measure, in order to provide joint mobility

Probably the biggest area that is thought of as being affected by massage, is on the muscular system. Used by athletes, people with injuries or just to feel good, massages effect on the muscle being worked on is widely known.

By increasing a good blood supply to the muscles from the heart; through massage, muscles are given a nutrient rich supply, thus aiding in recovery for the injured and helping to tone and excite the muscles and nerves in that area. Because muscles require large amounts of energy, there is a counter reaction and that is the production of chemicals such as lactic acid which builds up in the muscles producing cramp like effects. Massage can be used to help reduce the painful effects of this action and also to help calm muscle spasms – not just for the athlete, but also for other muscular/nervous system disorders.

By keeping muscles pliable, supple and toned, movements throughout the body can be better controlled and function correctly. With muscular injuries, whereby scar tissue forms, the area can lose its range of motion and elasticity, massage therapy can help to break down the adhesions this causes and help to lengthen the muscles to give better protection and to ready the muscular system for intense workouts in an athlete or to promote a better response to treatment from a recovering injury, as noted during tests for pain relief to patients of ankylosing spondylitis,

'The clinical implications (of massage) for athletes could be reduction of muscle spasm or cramps due to injury or fatigue' (Callaghan,M.J.,1993).

The limitations to these findings are that there is not one complete set of unified results on specific body parts, but have mainly been found when tested against different injuries, recovery or to measure performance using, in the case of athletes recovering from injury due to fatigue 'vibratory mechanical massage' (Callaghan,M.J.,1993), rather than a standardised regime of Swedish massage. Those reports which have identified massage as having no effect on athletes both pre and post event when using massage or no massage (Callaghan,M.J.,1993)are counteracted by further studies whereby pre-event routines were divided into 'general warm-up, warm-up and massage, massage only, warm-up and stretching' where the results showed that massage, both with or without a warm up 'increased the range of movement at the calf' (Callaghan,M.J.,1993). But again, it only looks at one aspect of massage rather than an overall systemic view and is only looked at through the eyes of athletes.

However the results from various trials come out, massage, especially in the sporting world has grown, as this communication shows,

'Watt (personal communication,1992) stated that 50 non-specific massages were performed on the UK team within 2 days at the European Indoor Athletic Championships in 1986...the number of massages carried out by physiotherapists and masseurs for the UK Team at the Winter Olympics at Albertville in 1992 was at least 164.....(and) Summer Olympics at Barcelona in 1992 was at least 787.' (Callaghan,M.J.,1993).

Whether the effects of massage are looked at as separate body parts, the whole as seen by this essay, shows that the systems of the body are clearly interlinked rather than to be seen in isolation.

An area where massage has been researched thoroughly and many respected medical practitioners have written clinical reports and conducted large scale trials is in the area of massage on oncology patients. My main area of interest follows the trial titled 'Massage for Children Undergoing Hematopoietic Cell Transplantation: A Qualitative Report' led by Professor Wolf E.Mehling based at the 'Osher Center for Integrative Medicine, The University of California, San Francisco & Department of Family and Community Medicine, The University of California, San Francisco' with whom I have been in regular correspondence with on this.

The background to this study was the fact that 'no in-depth qualitative research exists about the effects of therapeutic massage with children (hospitalised)' (Ackerman,S.L.,2012). The massages were given in hospital and also at home by parent/carers and also included some acupressure for the untrained parent in order to make them feel part of the trial, rather than isolated from it or their child's condition.

An important band of research on massage has shown 'benefits in managing adult and paediatric patients' distress related to cancer' (Ackerman,S.L.,2012) and so this report used open-ended interviews and perceptions of all participants, care givers and even the medical staff that may go unnoticed using only quantitative methods. This really is using touch and getting feedback from those involved,rather than a bunch of data.

With the results, it is immediately clear that for both patient and the care giver, results were noticed with parents saying that 'massage brought relief, comfort, and even pleasure to their children' (Ackerman,S.L.,2012). As written in the essay section beforehand, on the benefits of massage to the nervous system and promotion of relaxation, this was again found during the trial from both parents, caregivers, the children themselves and the medical staff, that the particular strength of massage was in the promotion of 'pleasurable sensations and a state of relaxation' (Ackerman,S.L.,2012).

Although results varied, in the words of one parent, known as 'P20' for the trial, 'Even though she's got a headache or even though she's got vomiting, she wanted to have massage.'

(Ackerman,S.L.,2012).

This shows that the effects of massage, not only act on the centres of touch – i.e. the part of the body being massaged, but indeed the parts of the endocrine system which control the hormonal amounts, even when the body is out of balance due to the cancer in the body and the necessary toxic levels given through chemotherapy. Massage in this trial clearly has a role to play in helping with physical and psychological aspects of the treatment, affecting sleep, relaxation and the physical acts of vomiting, but also affecting the relationship between the patient and parent.

In a section entitled '5. Massage's Effects on Parents and Family Dynamics' (of same report), where feelings of helplessness and anxiety are common for the parent seeing their child ill and going through treatment, being able to be part of their child's treatment resulted in amazing results, '(P23) It felt good because I was able to put her at peace, relax, help her go to sleep, help her with her pain.' (Ackerman,S.L.,2012).

The context in which these massages were given is also, I feel important to note, as in 1998 bone marrow transplantation was described as 'The most devastating treatment that the human body could be subjected to' (Ackerman,S.L.,2012).

The trial also sheds light on what had previously been examined in the essay section of this with the trials on athletes, that only one or the other – physical or psychological were examined, whereas throughout the trial of patients in this study, it has found that positive effects of massage are not one or the other but both simultaneously.

In a further study by 'CAM-CANCER Complimentary and Alternative Medicine for Cancer' and the use of massage for oncology patients, they refer to a study, 'Hughes *et al.* 2008, they found that massage could help support the function of the immune system during periods of immune suppression following cancer treatments such as chemotherapy' (Cooke,H & Seers.,2013). Although on a small scale, a 2011 narrative review concluded that 'massage therapy positively contributed to the reduction of pain, anxiety and depression.' (Cooke,H & Seers, H.,2013).

A major trial, led by Professor Wolf E. Mehling, entitled *Hematopoietic Cell Transplant and Use of Massage for Improved Symptom Management: Results from a Pilot Randomized Control Trial, 2011*, again looks at the role of specifically Swedish massage on paediatric oncology patients and their symptoms, notably of fatigue, nausea, vomiting and pain as well as mucositis and worry/anxiety. Over a 41 day period of hospitalisation, with Swedish massage being performed, based on nurse's data, and the child's self report, there was a trend, 'toward improved fatigue...fewer moderate/severe symptoms in a summary measure of fatigue, pain, nausea...and more self-reported beneficial changes for depression, contentness/serenity' (Mehling.W.E.,2011).

The results of massage, used specifically on paediatric oncology patients, between the ages of 5 to 18 years old, who by definition are going through traumatising treatment, clearly shows the beneficial effects of massage to the systems of the body as a whole. Rather than a measure of performance by purely data received tests, as shown by the increase of masseurs at the Barcelona Olympics, the effects of massage are clearly far more reaching than one would assume from first glance.

Not only then does massage provide a way to help bring balance back to the body, but can also help specific injuries and also to help alleviate physical symptoms acting on the body by an outside treatment – chemotherapy for example that is not only non invasive, but helps to provide a deep rooted almost nurturing effect on those receiving massage therapy in order to bring about a level of homeostasis to the entire body.

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