

Pregnancy Massage:

A relief for backaches during pregnancy

By

Tan Luor Shyuan Maudrene

Table of Contents

INTRODUCTION	4
PREGNANCY MASSAGE	5
Brief history.....	5
BENEFITS OF PREGNANCY MASSAGE.....	5
Hormone regulation.....	5
Fatigue/Insomnia	6
Morning sickness/Nausea	6
Reduction of oedema.....	6
Muscle aches.....	6
PREGNANCY MASSAGE IN SINGAPORE.....	6
BACK PAIN AND PREGNANCY, WHAT’S THE ASSOCIATION?	7
Joint laxity	7
Weight gain	7
Poor posture	7
LOW BACK PAIN	7
Associated muscles	8
Massage techniques	8
<i>Effleurage</i>	9
<i>Petrissage</i>	9
<i>Friction</i>	9
<i>Vibration</i>	10
<i>Stretches</i>	11
<i>Compression</i>	11
<i>Counterstrain</i>	11
<i>Myofascial Release</i>	12

Exercises.....	12
<i>Pelvic-tilt</i>	13
<i>Cat-purr</i>	13
<i>Back-stretch</i>	14
CONCLUSION.....	15
BIBLIOGRAPHY.....	16

INTRODUCTION

For mothers who yearn to have children, being pregnant is probably one of the most anticipated moments in their lives. However, the nine months of pregnancy can be the most wonderful or gruelling of times. While different mothers experience different symptoms throughout their pregnancies, there are common symptoms experienced during each period of the pregnancy.

First trimester

This is often the most challenging as the mother's body goes through a whole host of hormonal changes. Morning sickness or nausea is a common symptom, coupled with breast tenderness. Fatigue is usually felt as the mother's body tries to get used to the changes that are taking place.

Second trimester

This is probably the best period of the pregnancy as the morning sickness fades away and the fatigue eases. However, other physical discomforts such as muscle-ache and heartburn might start to set in.

Third trimester

Then comes the third and final trimester where more discomforts plague the mother: backache, insomnia, frequent trips to the ladies, oedema, constipation, etc.

Whilst most mothers struggle with the first trimester due to the morning sickness and all the hormonal changes, I personally found the third trimester most trying because I suffered from terrible backaches. Fortunately, there are complementary measures (such as pregnancy massage) to help reduce some of these discomforts, making pregnancy a whole lot more enjoyable and pleasant.

In this paper, I will first address pregnancy massage and its benefits, followed by its growing acceptance in Singapore and finally focus on how a pregnancy massage session can help alleviate backaches.

PREGNANCY MASSAGE

Pregnancy massage, also known as pre-natal massage, is massage catered especially for pregnant mothers. What separates it from normal massage is the way the mother is positioned and the way the massage is conducted: depth of work at certain areas, areas to avoid, etc.

Brief history

While the Chinese were the first to document about the use of massage in the Cong-Fu of the Toa-Tse¹ in 3000 BC, they only documented the use of pregnancy massage in Chinese medicine some 3000 years ago. The Chinese traditional massage used techniques such as Shiatsu, Thai, Tui Na and Jin Shin to help pregnant women relax, relieve stress and maintain good health throughout pregnancy.² It is interesting that although the ancient Chinese had used such methods to aid a woman through her pregnancy, many Chinese today do not follow such practices. This could be due to two reasons: 1) the knowledge of pregnancy massage had not been documented properly and passed down through the generations; 2) the knowledge might have been lost when our ancestors travelled around the globe in search for a better place to resettle.

In the last two decades, pregnancy massage had become increasingly popular, incorporating Swedish massage techniques developed by Per Henrik Ling.³ Swedish massage is the most commonly used technique in pregnancy massage as it is able to treat muscle discomfort and improve circulation, problems commonly associated with pregnancy.⁴ Other techniques such as deep tissue work, myofascial release and deep cross-fiber friction are also used to help reduce pain.^{5,6} In fact, to support the pregnant mother on a more holistic level, stretches and exercises should also be included to prolong the effectiveness of massage on the pregnant mother's body.⁷

So how does pregnancy massage help ease the discomforts of the mother-to-be?

BENEFITS OF PREGNANCY MASSAGE

Just like how general massage therapy has been used over time to improve overall health, reduce stress, and relieve muscle tension, pregnancy massage can help pregnant mothers-to-be rid them of most of the physical discomforts experience and allow them to enjoy pregnancy a lot more.

Hormone regulation

Past studies have shown that when massage therapy was introduced to women as part of their pre-natal care, there were not only significant reductions in anxiety and depression, but also improvements in the women's general mood. These positive effects were transferred to the babies, reducing post-natal complications.^{8,9} Field T et al had also shown that massage reduces cortisol levels, which reduces the risk of perinatal complications.¹⁰

Fatigue/Insomnia

Fatigue is felt throughout the pregnancy: first trimester - during which the changes in hormones is the greatest; second and third trimester - as the pregnant mother begins to feel her growing, active foetus. Massage helps mothers to relax and ease into sleep more easily, bringing about less negative feelings. These mothers tend to have babies who cried or fussed less.¹¹

Morning sickness/Nausea

Nausea and vomiting during pregnancy is quite common, although the intensity of nausea and vomiting differs between women. The paper by Agren et al found that soothing massage brought relief and relaxation to the women whose nausea ruled their lives.¹²

Reduction of oedema

It is very common for pregnant mothers to suffer from oedema of the extremities. Massage, such as lymphatic drainage, can help improve the removal of excess tissue fluids and, thus, reduce swelling.

Muscle aches

Hormonal changes, increase in weight from the expanding uterus and sleep disturbances all lead to strained and overworked muscles, causing discomfort and pain. Massage not only helps relieve the muscle aches but also improves circulation and increases oxygenation of soft tissues and muscles, benefitting the mother-to-be. In 1988, a research project was conducted by Esther Lockhart to study the effectiveness of massage therapy on patients with chronic pain. Patients who experienced chronic headache and back pain received massages twice weekly. The results revealed four areas of significant improvement of these patients over their control group: 1) reduction in physical pain, fatigue and depression; 2) improved moods and vitality; 3) reduced muscle tension and perception of tension; 4) decreased levels of mental and physical strain.¹³ Although this study was not performed on pregnant mothers, the effectiveness of the massage therapy in reducing discomfort is applicable to pregnancy massage therapy.

PREGNANCY MASSAGE IN SINGAPORE

There is clearly no lack of evidence to show that pregnancy massage is beneficial to women during their pregnancy. It is well accepted in the developed countries like Great Britain, United States and Australia. Yet, why is pregnancy massage not embraced in Singapore? This phenomenon could be a reflection of the stage of development of the country. Singapore had been a developing nation until about a decade ago. During the 1970s, my parents' generation was struggling to make ends meet and have no spare time or money to enjoy something like a massage. Today, my generation is experiencing the fruits of my parents' labour. Life is no longer about having to "make ends meet." What people in Singapore seek after these days is "quality of life." It is because of this need for "quality of life" and the knowledge that the foetus is well protected in the womb of the mother, that pregnancy massage is slowly being accepted as a way of improving the mother's well-being during her pregnancy.

BACK PAIN AND PREGNANCY, WHAT'S THE ASSOCIATION?

Back pain is a common physical discomfort felt by about 80% of mothers-to-be.¹⁴ It can happen at any stage of the pregnancy and the severity ranges from mild discomfort to unbearable pain. Joint laxity, weight gain and poor posture during pregnancy have a collective effect, contributing to back problems.

Joint laxity

During pregnancy, a woman's body produces a hormone called "Relaxin", which is essential for pregnancy and childbirth. As the name suggests, this hormone relaxes all the ligaments, resulting in instability in all joints in the body. Decreased stability in the joints increases the risk of the pregnant mother straining or spraining herself. As a result, the spine becomes vulnerable during pregnancy.

Weight gain

Naturally, as a pregnant mother progresses in her pregnancy, she will gain weight. The speed at which the woman gains weight will determine the amount of stress placed on her body. If non-pregnant women with larger waist sizes have higher incidences of lower back pain¹⁵, what about a pregnant mother with joint laxity?

Poor posture

The posture changes in a pregnant mother are largely due to the change in the shape and size of her belly. As the foetus develops and grows, the pregnant mother tends to arch her back to balance herself and prevent herself from falling forward. The spine is no longer in its neutral alignmentⁱ and is, thus, vulnerable to injury.

Whilst there are various types of back pain during pregnancy, such as sacroiliac pain, low back pain, sciatica, pubic symphysis, coccyx, thoracic spine and cervical spine, I am only going to focus on low back pain because that was what I and most of my clients suffered from.

LOW BACK PAIN

Low back pain during pregnancy is often referred to pain felt in the lumbar spine (usually L3 – L5). The pain is often caused by postural changes. As the pregnant mother's belly grows, her postural change affects both the spine joints as well as the muscles supporting the spine. Over extension of her lower back compresses the joints, leading to pain. Poor abdominal tone and separation in the recti muscles which try to support the excessive extension of the back, causes muscle inflammation and thus swelling. Depending on the extent of the postural change, the pain can range from being localized at the back, extend to the lateral sides of the waist or even radiate to the buttocks and lower extremities. Massage therapy comes in handy to reduce muscle spasm and other muscle-

ⁱ When each region of the spine is in its natural curve, the spine is at its strongest and least likely to suffer injury

related pain.¹⁶ In 1987, the Quebec Task Force on Spinal Disorders found that massaging pregnant women, who complained of back pain, reduced pain through removing painful stimulation or altering painful impulses.¹⁷

Associated muscles

In the later stages of pregnancy, usually from the fifth month, it is common to see lordosis set in as the pregnant mother tries to compensate for her growing belly. The growing weight puts additional stress on the lower vertebrae, hence contracting and tightening the lower erector spinae and transversospinalis muscles.¹⁸ This leads to pain in the lower back.

The abdominal muscles, which help maintain the posture of a person, are made up of several layers overlapping each other: the deepest layer being the transverse muscles, followed by the internal obliques, external obliques and the recti muscles. During pregnancy, the abdominals are stretched outwards from the mid-line, weakening their support of the lower back, hence causing backache.

With extra weight bearing on the lower back, weakened abdominal muscles, other muscles will have to work additionally hard in order to stabilise the lower back. These include muscles of the vertebral column (quadratus lumborum, lumbar erector spinae), gluteal muscles (gluteus maximus and minimus), thigh flexors (psoas major, iliacus and rectus femoris), and thigh abductor (tensor fascia lata and iliotibial band).¹⁸

Two of my clients (B and C) had tender muscles (Figure 1), that seemed not to fall into the groups of muscles listed above. In the case reports, I indicated that they had swollen latissimus dorsiⁱⁱ. However, after consulting the anatomy textbook¹⁹, I suspect that the swell could be their serratus posterior inferior muscles (Figure 2). This is because of the shape and size of the inflamed muscle.



Figure 1: B and C's swollen muscles



Figure 2: Serratus posterior inferior muscles shown by the red highlights²⁰

Massage techniques

Through my case studies, I found that the following massage techniques are useful in helping reduce or minimize the low back ache felt by my clients:

ⁱⁱ Latissimus dorsi muscle is involved in arm extension and adduction. Both confirmed that they had been carrying heavy objects with the arm on the side with the swollen muscle

Effleurage

This is a classic Swedish massage movement, characterised by a gentle, sweeping, relaxing stroke with varying levels of pressure.²¹ This technique is used to relax the muscles and improve circulation.

Effleurage strokes are often used at the start of the massage to spread oil and warm the body in preparation of deeper work. This is also a way for me to make an assessment of my client's body via touch. I find this technique effective in helping tensed muscles relax since the stroke is smooth, flowing and continuous. I frequently use this technique in between other techniques to give the muscles a chance to rest, relax and loosen up before working deeper into them. In A's case, I used various techniques to help release her tensed lumbar erector spinae but linked each new stroke with effleurages – effleurage, friction, effleurage, stretching, effleurage, rocking. I found that alternate effleurages was useful in helping her muscles “get ready” for the next technique. It also ensured that I did not overwork the already tensed muscles causing them to go into further spasm.

Petrissage

Another classic Swedish massage movement is using kneading or rubbing-with-force motions to breakdown tension in tissues and muscles.²¹ I found petrissage a little challenging to do when working on clients' back since most of my clients were in the side-lying position. When working with the larger muscle group (e.g., latissimus dorsi), I found it difficult to lift the muscles and knead them. Instead, it was easier to do thumb kneading on inflamed muscles.

Tender muscles present themselves as bulging, tensed spots, making it very easy to manipulate them. With B's and C's swollen serratus posterior inferior muscles, I had no difficulties getting my thumbs “under the muscle” and kneading them (Figure 3). With tender muscles, it takes some manipulations before the tension in the muscles breakdown and the swell eases away. I found that thumb petrissages and effleurages together worked well in breaking down the toxins and easing the tension in their muscles.



Figure 3: Thumb petrissage



Figure 4: Thumb friction

Friction

This technique refers to all variations of rubbing usually using the thumbs or fingers. It is frequently used to work on small areas of tight muscles. For me, cross-fibre friction and along-fibre friction were two techniques that I liked using in my practice as a way of warming up the muscles before working more deeply into them. However, I am careful not to overwork the skin to avoid causing

soreness. I make this judgement based on the redness of my client's skin. The moment I notice that my client's skin starts turning red, I stop the rubbing.

During E's second session, I used friction techniques to help her with her tight lumbar erector spinae. Quick, short strokes were used to warm up her tight muscles. I found that with E, warming up the muscles sufficiently prior to working deep worked well for her. As usual, I always alternate effleurages with friction strokes to give the muscles time to relax before working on them again.

Friction strokes also worked well on the lower back. For one of my clients (F) I used short friction strokes to heat up the area of her back just above her sacrum prior to working deeper into the latissimus dorsi muscles (Figure 4). In addition to the short strokes, applying firm, circular movements around the area also helped to reduce the tension in the muscles. As her entire lower back was aching, I slowly worked from the midline of her back to the lateral side and back again. I followed each set of friction strokes by effleurages before repeating the friction strokes. Of course in this case, effleurages were made from midline of the area above the sacrum towards the lateral side of the body (along the sacrum bone).

Vibration

Vibration here refers to the use of the therapist's hands to shake or rock the muscle in the hope that the process will loosen or release the tightness in the muscle. This can be done gently or vigorously, depending on appropriateness and the effect the therapist is trying to achieve. Gentle shaking is usually done at small areas where the hand/finger is placed on the desired area and the hand/finger moves briskly from side-to-side. Vigorous shaking is usually done on the extremities where the entire limb is shaken to help stimulate the limb. In my therapy, I use the gentle shaking more.

I did not start using this technique until I watched the pregnancy massage video by Leslie Stager.²² She used this technique to help loosen facial (masseter) muscles that tended to tense up during contractions (Figure 5). After watching the video, I realised that I could use this technique on stubborn inflamed muscles. That was exactly what I did with D on her fourth session when a stubborn knot in her rhomboid muscles refused to ease with petrissage and friction techniques. The vibration technique came in handy in loosening the knot. I only had to use two fingers in this technique and after three rounds of vibration, the knot miraculously relaxed and slowly eased away. Before this, I seldom used this technique because I felt that it was not as effective as others, but the effect that it had on D proved me completely wrong.



Figure 5: Vibration on the masseter muscle



Figure 6: Stretching of the gluteus muscle

As for vigorous vibration, I had only used it once on F. She had tight hamstrings that seemed to hurt even after I have worked it with all the other classic Swedish techniques. However, when I took her upper thigh and vibrated it between my hands, it helped reduce the tightness, allowing me to work more deeply to release the tension in them.

Stretches

Stretches refers to the physical stretching the muscles either with the forearms, hands or fingers of the therapist. Stretching the muscles elongates and allows for energy flow through the muscle, thus loosening the tightened area. Stretches come in very handy to help loosen the gluteus muscles. Generally, I use stretches a great deal, though not as much on muscles associated with low back pain. Most of the stretches that I do are on the neck and arms, although I do perform some leg stretches when the client complains of pain in the gluteus area.

During one of the sessions, E had tight gluteus, hamstrings and calf muscles. I first tried compressions on her gluteus, but that proved painful for her, thus, I decided to try stretching her hamstrings to see if that helped. I took her leg and brought it closer to her body, on the side of her belly (Figure 6). I also took her leg into various positions to check the extent of the pain in her gluteus. None of the positions proved to be painful, but having done the stretches made the compressions on the gluteus muscles more effective for E.

Compression

Other names for this technique include pressing/squeezing. The aim of this technique is to help the muscles relax slowly. Compressions can be done with the thumb, palm, heel of the hand or the elbow. Most of the compressions used in my massage therapy take place at the gluteus muscles. First, I palpitate the gluteus muscles to find out how tensed they are. Depending on the tightness of the muscles, I will apply an appropriate pressure by compressing GB30 (also known as the piriformis release point). This point is believed to help relax the strained back. The tighter the muscles, the lighter the pressure used (e.g., thumb versus elbow), to ensure that the client will not feel additional pain.

For all my clients, this is a standard procedure that I do because I believe that compressing this point provides some relief even though they might not be experiencing any pain in the gluteus muscles. However, E found this technique, coupled with the hamstring stretch useful in helping her with her strained gluteus muscles. In her second and third sessions, she felt pain in her gluteus muscles (which were a result of muscle pull either in her adductors or her calves). Stretches, coupled with compression strokes were effective in reducing the discomfort in her gluteus.

F also found this technique effective. Her piriformis always seemed tight and I was careful to only use my palm to work on her gluteals. In fact, there were occasions where I had to use my thumbs as they would hurt if I exerted a little more pressure. Under those circumstances, I used the counterstrain method to help release some muscle tightness prior to using compression on her.

Counterstrain

I picked this up when I attended an introduction course to sports massage with Dr Myk Hungerford. The aim of the technique is to release the muscle fibres that have knotted together via compression and/or approximation.²³ The therapist attempts to bring the muscle's origin and insertion towards

each other by placing one hand above the problem area and other hand below. Both hands compress downwards towards the bone and are brought towards each other (Figure 7).



Figure 7: Counterstrain technique on the erector spinae muscles

I first started using this technique with E when I found that effleurage and friction strokes were taking a long time to ease the tightness in her erector spinae muscles. I have to admit that it was initially difficult to perform this technique on the erector spinae because E was in the side-lying position. However, I realised that the trick to this technique was to be able to contain the tight muscles and approximate the area with both hands. Once I realised that, it made using the technique easier even if the client is in the side-lying position.

Myofascial Release

This is a type of soft tissue therapy used to relax contracted muscles. It aims to improve circulation through stretching the muscles and overlying fascia. I personally like this technique because its slow motion really helps to stretch muscles and layers of fascia. The only downside of this is that on areas of really tight muscles like iliotibial (IT) band, it can be very painful. I used quite a bit of this technique in my massage therapy, especially on the legs of clients.

Most of the time, I found it easier to use my forearm to work on clients' IT band. However, should they have very tight IT band or if they only like mild pressure, I will use my palms. For example, during E's third session, the area around her IT band was painful to touch. In such circumstances, using the forearm to perform the myofascial release was not appropriate. In fact, I had to use compression and petrissage techniques to help loosen the muscles around the IT band prior to using the myofascial technique with my hands. The combined use of aforementioned techniques helped reduce the ache at the lateral side of her thigh.

However, tight IT bands are not easily loosened, even with the help of massage. With A, even after several repetitions of myofascial, her IT band only relaxed slightly. I think it requires constant stretching and myofascial release massage to fully remove the tightness in the IT band.

Exercises

Personally, I believe that massage is not the sole solution to elevating pregnancy-related back pain. It is a temporary measure to relief the strained muscles that are being compromised to support the change in the body's posture. After the massage, the muscles supporting the lumbar spine are relieved of their strains. However, to prolong the effects of the massage, the pregnant mother has

to put in some effort on her part. This is where stretches come in. There are many stretches that the pregnant mother can do to alleviate low back pain, but I found the following 3 exercises useful for my clients:

Pelvic-tilt

Standing up, the client is encouraged to focus on tucking her pelvis under her body, so that the back flattens. It helps if she bends her knees slightly. Most of my clients had difficulties trying to understand “tucking the tail bone under her body”. Hence I had been searching for a better way to do this and I found it in the book by Alicia M. Silva.¹⁴ Alicia’s technique (Figure 8) is to have the pregnant mother lie on the floor with her knees bent and feet resting on the floor. There will be a gap between the mother’s small back and the floor. Then, flatten the lower part of the spine against the floor so that there is no longer a space between the spine and the floor. This is the pelvic tilt. Hold the tilt for a few seconds and repeat the exercise about 20-30 times.

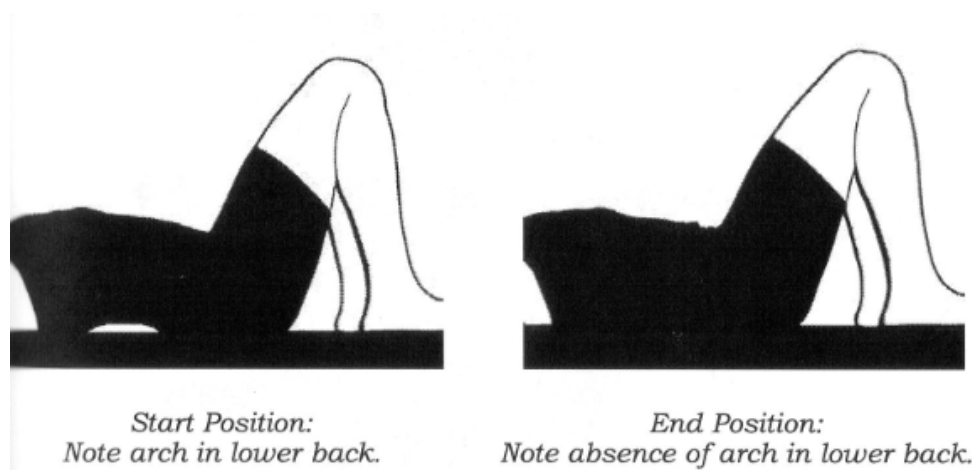


Figure 8: Pelvic tilt in supine position²⁴

The advantage of this method is that the client will definitely understand what a pelvic tilt is. The disadvantage, however, is that if the client is heavily pregnant, it may not be good to have the client on her back for more than five minutes. Perhaps the best way to introduce this is to have the client try out the pelvic tilt on the floor to get a sense of how the body should feel, but suggest that the client do the exercise standing up.

Cat-purr

The actual name of this exercise is the cat stretch, but somehow, I have called it the cat-purr throughout my case reports. This is done on all fours where the pregnant mother, on her out-breath will round her back and pull in her abdomen (Figure 9). She should hold the position for a few counts, then relax. When relaxing, her back should no longer be rounded, but should be parallel to the floor and not arch downwards (Figure 10).



Figure 9: Rounded back on out-breath²⁵



Figure 10: Flat back on in-breath²⁵

Back-stretch

This back stretch exercise not only helps to elongate the back muscles along the spine, but also helps undo the lordosis during pregnancy. The pregnant mother should sit back on her knees, with her legs spread wide (to accommodate the belly) and stretch her arms forward (on the floor) to feel the stretch on her back (Figure 11).

Depending on how big her belly is, she can use a pillow to support her abdomen. Alternatively, if her belly is too big for her to stretch her arms forward on the floor, she can stretch her arms



Figure 11: Back stretch

forward holding on to an exercise ball, or do the exercise sitting on a chair and stretching her hands onto the table. The only downside of these two alternatives is that she will not feel the stretch as much as compared to having her hands stretched above her head and touching the floor.

CONCLUSION

In the olden days, many pregnant mothers go through their pregnancy suffering from low back pain and they do not turn to anyone to help them alleviate their pain. To be able to get pregnant is a natural miracle and sometimes it requires some effort to be able to enjoy it. But no woman should have to go through her pregnancy suffering from back pain or any physical discomforts.

A qualified pregnancy massage therapist (QPMT) will be able to use a combination of massage techniques to relieve the pregnant mother of her physical discomforts (such as back pain). A QPMT will also be equipped to show and teach the pregnant mother some simple exercises that she can do to alleviate her physical discomforts. While it is true that going to a QPMT will relieve the pregnant mother of her physical ailments, it is important to highlight that the pregnant mother also has a role to play – by exercising. By solely relying on the QPMT, the pregnant mother will not fully benefit from the effects of the massage. It is only when both parties work hand-in-hand, that the pregnant mother will be able to exploit the full benefits of each massage session. That is why I tell my clients that I do not aim to be their massage therapist, but their *partner* through pregnancy.

BIBLIOGRAPHY

-
- ¹ <http://www.thebodyworker.com/history.htm>. 28th August 2010.
 - ² <http://www.kwintessential.co.uk/articles/article/China/Chinese-Medicine-for-Pregnancy/1811>. 28th August 2010.
 - ³ <http://www.gotosee.co.uk/therapies/Pregnancy-Massage.htm#History>. 7th Jan 2010.
 - ⁴ <http://www.gotosee.co.uk/therapies/Pregnancy-Massage.htm#History>. 7th Jan 2010.
 - ⁵ Osborne-Sheets, C. Deep Tissue Sculpting: A Technical and Artistic Manual for Therapeutic Bodywork Practitioners. Body Therapy Associates and International Professional School of Bodywork: San Deigo, CA, 1990, p13-15.
 - ⁶ Cyriax, J. Indications for and against deep friction. Textbook of Orthopaedic Medicine. Vol 2 Treatment by Manipulation, Massage, and Injection. 11th Ed. Baillier-Tindall: Toronto, Ontario, Canada, 1984.
 - ⁷ Suzanne Yates. Diploma Course (in Pregnancy massage) for massage therapists.
 - ⁸ Field T et al. Massage therapy reduces pain in pregnant women, alleviates prenatal depression in both parents and improves their relationships. J Bodyw Mov Ther. 2008 Apr;12(2):146-50.
 - ⁹ Field T et al. Pregnant women benefit from massage therapy. J Psychosom Obstet Gynaecol. 1999 Mar;20(1):31-8.
 - ¹⁰ Field T et al. Cortisol: The culprit prenatal stress variable. Intl J Neuroscience. 118(8):1181-1205.
 - ¹¹ Field T et al. Sleep disturbances in depressed pregnant women and their newborns. Infant Behavior & Development. Feb 2007;30(1):127-133.
 - ¹² Agren A et al. Tactile massage and severe nausea and vomiting during pregnancy – women’s experiences. Scandinavian J Caring Service. Jun 2006;20(2):169-176.
 - ¹³ Lockhart, Esther. Massage therapy: mind/body effects on chronic pain patients. Master’s Thesis, University of North Texas, Denton, Texas, 1988.
 - ¹⁴ Alicia M. Silva, MPSPT. Preventing and Managing Back Pain during Pregnancy.
 - ¹⁵ Han TS et al. The prevalence of lower back pain and associations with body fatness, fat distribution and height. Int J Obes Relat Metab Disord. 1997 Jul; 21(7):600-7.
 - ¹⁶ John Yates. A Physician’s Guide to Therapeutic Massage: Its Physiological Effects and Their Application to Treatment. Massage Therapists’ Association of British Columbia: Vancouver, BC, Canada, 1990.

¹⁷ Quebec Task Force on Spinal Disorders. Scientific approach to the assessment and management of activity-related spinal disorders. *Spine*, 12: No. 7, 1987, Supplement 1, p 524.

¹⁸ Yates, Suzanne. *Pregnancy and Childbirth: a holistic approach to massage and bodywork*. Churchill Livingstone. Elsevier. 2010.

¹⁹ McKinley M, O'Loughlin VD. *Human Anatomy*. McGraw-Hill International Edition. 2006

²⁰ Image courtesy from http://en.wikipedia.org/wiki/Serratus_posterior_inferior_muscle

²¹ Tucker Louise. *An Introductory Guide to Massage*. ITEC textbook. Holistic Therapy Books. 2001.

²² Stager Leslie. *Mastering Pregnancy Massage*. Real Bodywork. DVD.

²³ Hungerford Myk. *Beyond Sports Medicine – Styles, Technique and Science*.

²⁴ Figures courtesy of Alicia M. Silva, MPSPT. *Preventing and Managing Back Pain during Pregnancy*

²⁵ Figures courtesy of <http://www.motleyhealth.com/yoga/prenatal-yoga-cat-stretch-posture>