



Clinical Case Report Competition

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Myofascial techniques combined with core strengthening to improve post-partum posture

Abstract

Objective

The purpose of this study is to determine if massage therapy and fascial release combined with core strengthening exercises promote functional scar tissue formation and improved postural alignment after C-section surgery.

Addressing postural and scar adhesion issues during the early recovery period may promote health and well being of women recovering from Caesarean section surgery by preventing compounding soft tissue injuries. The expectation is that working preventatively will reduce the need for medical intervention of injuries incurred in relation to chronic postural dysfunction.

Methods

Treatment techniques employed included postural evaluation, hot hydrotherapy, myofascial scar release, and Swedish massage. Core strengthening exercises based on yoga postures were prescribed and completed daily. Ongoing postural assessments were conducted through the treatment period to observe progress. Pain scales were used to measure pain and discomfort of the scar site and frequency and intensity of headaches.

Results

By the end of the study the participant noted decreased pain at the incision site, increased deep tissue scar mobility, increased tone of abdominal musculature, and reduced intensity and occurrence of posture related cervicogenic headaches.

Conclusions

Retraining the pelvic floor and deep abdominal musculature combined with scar tissue mobilization promotes postural alignment from the core out. This methodology may help to prevent injuries and postural syndromes related to the vulnerability of new mothers' musculoskeletal system.

Keywords

Pregnancy, post-natal, Caesarean section, myofascial release, massage therapy, scar tissue, surgery

Introduction

Caesarian section birth has become increasingly more common in North America over the past several decades. In 2004, Caesarian section delivery accounted for 29.1% of all births in the United States, totaling 1.2 million deliveries. (Kisner & Colby, 2002).

Possible reasons for the increase elective C-section delivery may include, the perceived convenience of scheduled delivery dates, and that many obstetric healthcare providers recommend C-section delivery if previously delivered children were born in this manner. 33% of Caesarian section deliveries are repeat procedures. The Vaginal Birth After Caesarian (VBAC) movement has become more evident, with more women successfully delivering their subsequent babies vaginally. It is normally recommended that a woman wait 18 months before attempting to deliver a baby via VBAC, as complications arising from subsequent pregnancy and labour on the prematurely healed post-surgical womb includes rupture of the uterine wall during contractions. If subsequent pregnancy occurs, and delivery dates fall sooner than the recommended uterine and abdominal wall healing time, repeat C-section is advised. Labour may pose serious risks to the mother if the uterine surgical scar is challenged before full maturation has occurred. Repeated C-section delivery may increase the likelihood of developing abdominal myofascial adhesion.

Deep wound healing is a complex process where the body attempts to restore the tissue to normal function. Due to multiple layers of tissues needing repair, and the impossibility of complete regeneration of lost tissue, scarring results. Formation of this necessary scar tissue unfortunately yields a decrease in functionality. The four phases of deep wound

healing include: and inflammatory phase, a migratory phase, a proliferative phase, and a maturation phase. It is during the last two phases that fascial manipulation can have the greatest influence and possible permanent change within the new tissue. During the proliferative phase, extensive growth of epithelium beneath the scab occurs with ongoing randomly arranged deposition of collagen by fibroblasts. The restoration of epidermal thickness, declination of fibroblastic activity, collagen fiber organization, and blood vessel restoration characterize the maturation phase. Scar tissue differs from normal tissue in that its collagen fibers are more densely arranged, and has a marked decrease in elasticity and vascularity. It does not contain the same amount of hairs, glands or sensory structures undamaged skin (Tortorra & Derrickson, 2009).

Internal fibrosis in response to the tissue repair of abdominal surgery can be expected in the post-caesarian section patient. Adhesions may form between organs, soft tissue, and fascial layers that may not have been in place before surgery. Scar tissue and fascial adhesion can be positively impacted by manual therapies, and may exert most influence during the early stages of tissue maturation. Massage therapy is useful in loosening adhesions between scar and surrounding soft tissues. Elongation of the scar and adjacent tissue will promote function (Hertling & Kessler, 2006). These adhesions can cause pain and discomfort to the patient due to the decrease in mobility of tissues. Postural adaptation may occur in response to scar tissue contraction and adhesion formation. Corresponding movement of the soft tissues surrounding muscles, joints, bones, and visceral organs accompanies all movements of the trunk. Impaired movement of soft tissue and joint movement will recur as long as soft tissue mobility is not restored (Lewit

& Olsanska, 2002). Fascial mobility plays a key roll in maintaining postural balance and ease of movement. Soft tissue treatment should be initiated as soon as sufficient healing has occurred. This will minimize adhesions that may contribute to postural problems and back pain (Kisner & Colby, 2006).

Scar tissue is organized in lines of stress. By including strengthening exercises in combination with stretches, the forming scar is forced to develop in functional lines.

Transversus abdominus is the deepest of the four abdominal muscles. Built like a corset around the trunk, it is the only abdominal muscle to attach directly to the spinal joints. It is normally the first muscle activated by the nervous system when initiating any type of movement. The pelvic floor muscles and the transversus abdominus share a neurologic link and are incapable of engaging independently (Jemmett, 2003). Due to the physical stresses of childbearing on a woman's abdominals and pelvic floor, rehabilitation of these structures is especially important when recovery from pregnancy is complicated by surgical delivery.

Mobilization of fascial structures paired with appropriate strengthening provides the best environment for postural realignment. Because the post-partum woman is under the influence of hormonal joint laxity for several months after delivery, postural correction may be most effective during this timeframe. Permanent postural change may be attained, and the sequelae of fascial restriction syndromes related to surgical scarring may be averted.

Case History

Participant was a healthy and active 30-year-old mother of two young boys both born via uncomplicated Caesarean section, 17 months apart. Both pregnancies were endured with little discomfort to the participant, except for severe pubic symphysis pain that ailed her for the last four weeks of both pregnancies. A physiotherapist-prescribed exercise program alleviated most symphyseal discomfort when the condition occurred during the second pregnancy. Upon delivery, the condition subsided immediately. Her first child was born after an arduous and non-progressive three-day labour in March of 2010. Her second son, exactly five weeks old at the start of the study, was born in August 2011, after a planned surgical delivery. During treatment #1 the surgical scar was still sensitive to the touch, but showed no signs of delayed healing or infection. The participant's abdominal strength was expectedly compromised after carrying her fetus to full term. Lactation and breastfeeding were well underway by the first treatment, with associated postures possibly contributing to headaches due to shoulder and neck pain. Occurrence of cervicogenic tension headaches varied, approximately once every nine to 15 days. Water consumption was lower than the recommended 2-3 L. for nursing mothers, averaging less than 2 L. per day.

Treatment Goals and Precautions

Treatment goals:

- Increasing mobility of C-section scar tissue, preventing adhesion formation
- Promotion of neural repair in skin around surgical incision
- Enhance incisional circulation and healing, therefore decreasing pain

- Decreasing headache frequency and pain associated with postural dysfunction
- Re-gaining physical strength and sense of autonomy after pregnancy
- Prevention of faulty postural habit formation through discussion and homecare exercises
- Encouraging water consumption and patient education regarding the importance of adequate hydration of a nursing mother and the possible link to fascial restrictions and headaches

Considerations to treatment:

- Joint laxity up to 5 months postpartum, especially if breastfeeding, due to the ongoing presence of the hormone relaxin (Kisner & Colby, 2006)
- Breast sensitivity due to lactation engorgement may make prone positioning uncomfortable. Pillowing under the shoulders and between the breasts can alleviate some of the pressure
- Pillowing under the abdomen may alleviate pain at the surgical site due to prone positioning
- Homecare exercise choices must be made in consideration the patient's history of pubic symphysis pain and modified to not re-aggravate the symptoms
- Scar tissue itchiness due to the new tissue's loss of glandular function and histamine release during the healing process may be aided by applying moisturizing lubricants (Hertling & Kessler, 2006)
- Cutaneous neural regeneration around the incision may make the area sensitive to the touch. Therapist should modify technique application if patient complains of major discomfort during treatment

- Assessment of the continuity of the diastasis recti is recommended to determine safe abdominal strengthening protocol (Kisner & Colby, 2006)

Methodology

Assessment Measures

A 0 to 5 Pain scale was used to measure scar pain and headache occurrences/intensity between treatments. These scales were used retrospectively; the participant graded the degree of her headaches recalling discomfort between the last treatment and current assessment. Palpable abdominal muscular tonus was evaluated by the therapist every treatment. Postural assessments were conducted before treatment #1, #6, and #10 using the plumb line land marking and guidelines described in *Muscles Testing and Function* by F.P. Kendall et al.

Headache Pain Scale

0 = No headache noted

1 = Very mild pain, just aware of headache, does not interfere with ADLs (activities of daily living)

2 = Mild pain, more persistent, can manage pain while accomplishing ADLs

3 = Moderate and persistent pain, resolved on own or was managed with increased water consumption and simple hydrotherapy applications, i.e. hot foot bath, cold compress to the head

4 = Used NSAIDs (non-steroidal anti-inflammatory drugs) and hydrotherapy

interventions, could continue with ADLs, though with discomfort. Did not persist after a good night's rest

5 = Used NSAIDs for pain and had to alter ADLs, i.e. lie down in quiet room. Pain persisted after rest

Scar Pain Scale

0 = No pain

1 = Very little strain or pulling discomfort with upper extremity reaching motions, only when deep pressure palpation applied

2 = Strain or pulling discomfort felt when executing upper extremity reaching motions

3 = Pain felt when executing upper extremity reaching motions, no pain upon palpation

4 = Pain felt with moderate trunk movements and moderate palpation pressure

5 = Pain felt with slight trunk movements, limiting ADLs, and light palpation pressure

Modalities

The study consisted of ten 60 to 75-minute treatments conducted over a six-week period. Therapeutic modalities used included hot hydrotherapy applications, myofascial release, Swedish massage, muscle energy technique, trigger point release, and passive or hold/relax stretching. Homecare exercises were based on core strengthening and yoga postures to promote muscle strength and fascial alignment to support the manual therapy treatment goals. Treatments #3 to #10 begun with a ten-minute hot compress application over the surgical scar, to prepare the tissue for 30 minutes of fascial scar tissue release.

Other areas of treatment were prioritized according to the participant's complaints and therapist recommendations.

Homecare

All homecare exercises prescribed were chosen to promote the continuation of fascial realignment that was established in treatment and were based on standing yoga postures.

Promotion of core strengthening before external musculature rehabilitation was instigated in order to build strength from the inside out, preventing muscular imbalance and associated injuries.

The participant was educated about core strengthening. Proper engagement of pelvic floor musculature (Kegel exercises) and the innermost abdominals (transversus abdominus) when executing daily activities was the first homecare implemented (Jemmett, 2003). Further stretches and exercises were built on this foundation and promoted lengthening, strengthening and muscular balance to promote post-natal functionality. The participant exhibited high compliance with all exercise prescriptions through the duration of the study.

Results

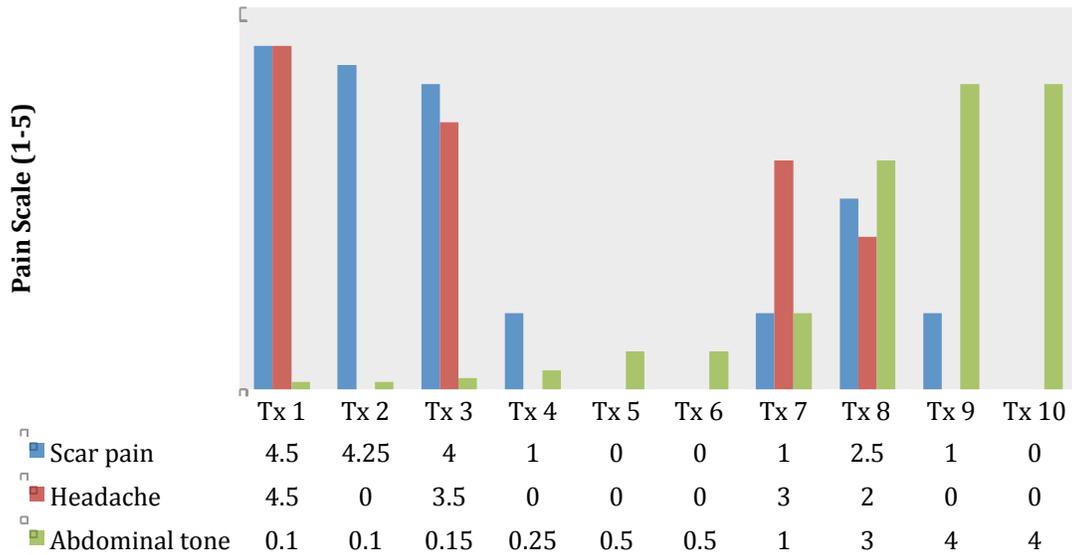
Assessment #1 revealed slight/moderate anterior pelvic tilt, possibly due to observable lack of abdominal muscular tone, forward-rounding shoulders, protracted scapula with head-forward posture, and exaggerated kyphosis. Such postural tendencies appear routinely in women in their childbearing year due to common physical demands of this population. Subsequent postural assessments of treatments #6 and #10 revealed only

slight improvements, as the participant had only minor postural faults. Changes that did occur were linked to her increased fitness level and regained muscular tonus. The anterior pelvic tilt noted in assessment #1 was not apparent in the final assessment and may be attributed to the participant's increased abdominal strength and rebalancing of anterior, posterior, lateral, and diagonal myofascial lines achieved by treatment.

Scar adhesion had palpably decreased in all planes of tissue movement. Deep releases were achieved with less effort each treatment. The right end of scar remained significantly more sensitive and more palpably fibrotic than the rest, but pain generally decreased through the treatment period. The participant noted that more trauma occurred in this region during delivery due to manipulation of the tissue aiding the baby's passage. A spike in scar pain occurred after treatment #7, as indicated in *Fig. 1*, due to a more aggressive approach to fascial release. This area was more sore than other areas of the scar during all treatments and remained the only area of discomfort upon palpation by the end of the treatment period.

A palpable increase in abdominal muscular tone was evident from treatment seven on. Cutaneous neural discomfort disappeared in the skin surrounding the incision site. Headache frequency and intensity declined through the treatment period. The participant noted an increase in body integration and renewed sense of autonomy.

FIG. 1 SCAR PAIN, HEADACHE & ABDOMINAL TONE COMPARISON



Discussion

Abdominal tone increased through the treatment series, while abdominal adipose decreased. It was difficult to determine if muscle tone increased, or if it simply became more palpable as the adipose layer was shed. Use of a scale to measure fluctuations in body weight, and employment of manual muscle testing to measure abdominal strength would have added more quantitative data to this study.

More research needs to be conducted on the effects of myofascial scar release on this population. Understanding the effects of post-surgical postural dysfunction and the long-term implications this may have on healthcare costs, is relevant due to the increase in occurrence of Caesarean section births. Preventing soft tissue injuries reduces the need for orthopedic medical intervention.

Conclusion

Results indicate that massage therapy can aid in the rehabilitation of new mothers who have undergone Caesarian section deliveries. Influencing the maturing scar tissue at the site of incision can promote functional mobility of this new tissue. Promoting postural myofascial alignment through carefully developed exercise and stretching programs supports the therapeutic goals of decreasing fascial restriction in the post-surgical patient. The overall result is an increase in the functionality of the scar and a decrease in postural dysfunction syndromes. Massage therapy can therefore be considered a beneficial component to post-natal surgical recovery.

References

1. Kisner, C. & Colby, L.A. (2002) *Therapeutic Exercise Foundations and Techniques 5th Ed.* Philadelphia: F.A. Davis Company.
2. Kendall, F.P., McCreary, E.K., Provance, P.G., Rodgers, M.M. & Romani, W.A. (2005) *Muscles: Testing and Function with Posture and Pain 5th Ed.* Philadelphia: Lippincott Williams & Wilkins.
3. Kessler, R.M. & Hertling, D. (2006) *Management of Common Musculoskeletal Disorders: Physical Therapy Principals and Methods 4th Ed.* Philadelphia: Lippincott Williams & Wilkins.
4. Tortorra, G.J. & Derrickson, B. (2009) *Principals of Anatomy and Physiology 12th Ed.* U.S.A.: John Wiley & Sons, Inc.
5. Davis, F.A. (2009) *Taber's[®] Cyclopedic Medical Dictionary 21st Ed.* U.S.A.: F.A. Davis Company.
6. Rattray, F. & Ludwig, L. (2005) *Clinical Massage Therapy Understanding, Assessing and Treating Over 70 Conditions.* Elora: Talus Incorporated.
7. Jemmett, R. (2003) *Spinal Stabilization: The New Science Of Back Pain 2nd Ed.* Halifax: Novont Health Publishing.
8. Lewit, K. & Olsanska, S. (2002) *Clinical Importance of Active Scars: Abnormal Scars as a Source of Myofascial Pain.* Journal of Manipulative and Physiological Therapies, Vol.27 (#6), p399-402.