

A Review on Physical Therapy Techniques and Modalities for Breast Pain

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Breast pain is a common phenomenon amongst women; however, there is a lack of research investigating conservative efforts for treatment. Many different conditions can lead to symptoms of breast pain. This literature review will discuss the evidence related to physical therapy techniques and modalities that can be used to treat breast pain resulting from breast cancer treatment, as well as breastfeeding difficulties of engorgement, blocked ducts, and mastitis.

Chronic Pain Secondary to Breast Cancer

As many as 24% to 47% of patients report symptoms of chronic pain following treatment for breast cancer. The most frequently reported sites of the reported pain are the axilla, the excised breast area, the medial arm, the ipsilateral thorax, and the mastectomy scar.¹ Symptoms of anxiety and depression are higher in the population of individuals with cancer and can also contribute to reports of chronic pain. Chronic pain should be treated with a biopsychosocial approach, which considers the biological, psychological and social factors contributing to the patient's pain. This can improve the patient's self-efficacy, which may have a larger impact than passive treatment with drug therapy.²

Treatments for chronic pain secondary to breast cancer

TENS, TSE or Placebo

Transcutaneous electrical nerve stimulation (TENS) is a common nonpharmacological treatment for pain. TENS reduces pain by addressing both central and peripheral mechanisms.

Centrally, TENS activates areas of the spinal cord and brainstem that use opioid, serotonin, and muscarinic receptors in order to induce analgesia. Peripherally, opioid and noradrenaline receptors are activated at the site of TENS placement.³ A study by Robb et al. investigated the efficacy of TENS compared to transcutaneous spinal electroanalgesia (TSE) and placebo on chronic pain following breast cancer. The study was a double blinded randomized controlled trial with 41 participants.⁴ The participants' pain was never described in the study, but the protocol addressed pain in the upper extremity and thorax. All three treatments showed improvement in subjective reports of worst pain, average pain, and pain interference scores. More participants rated the efficacy of the TENS machine higher than the control, which may have been contributed to by the direct contact of the TENS machine over the area of pain. According to a follow up questionnaire, 95% of the participants reported great benefit from being able to discuss and receive validation of their pain from a healthcare professional.⁴ This study demonstrates that electrical stimulation via TENS or TSE is well tolerated in women and may improve pain symptoms. Due to the improvement in the placebo group and the patient reports of the benefit of validation of their pain, there is likely a psychological component contributing to the improvement of pain in the participants.⁴

Exercise + Cognitive Behavioral Therapy

According to the World Health Organization, exercise is defined as a “sub-set of physical activity that is planned, structured, repetitive, and aims to improve or maintain one or more components of physical fitness.”⁵ Exercise has been shown to reduce the severity of pain, improve physical function, and quality of life in patients with chronic pain.⁶ Cognitive-behavioral therapy (CBT) is a form of psychotherapy that focuses on changing maladaptive

thoughts that contribute to maladaptive behavioral patterns.⁷ CBT for chronic pain focuses on improving an individual's ability to cope with their pain and therefore reducing pain perception and distress.⁸ One systematic review found CBT to be effective at reducing pain in 43% of studies, with the authors concluding that more research should be conducted specifically for cancer-related chronic pain.⁸ A study by Robb et al. evaluated the feasibility and effectiveness of a comprehensive pain management program including treatment by a physiotherapist and psychologist in decreasing chronic cancer-treatment related pain. The study had a small sample size of 13 participants, with 9 having a diagnosis of breast cancer and subsequent pain in the breast, axilla and upper extremity.⁹ Both the physical therapist and psychologist provided individualized interventions. The physical therapy interventions included goal setting, education on pain theory and exercise, introduction of an exercise program including aerobic and strengthening activities, postural exercises, and a summary session. The psychological interventions included goal setting, education on the many factors of pain, self-monitoring, relaxation techniques, cognitive skills and a summary session. Following the 3-6 months duration of interventions, there was a significant decrease in pain as measured by the Brief Pain Status Questionnaire and the Physical Severity Index from the Pain Coping Inventory.⁹ Because of the study design, the improvements cannot be solely attributed to the interventions. Although the results from this study are promising, a large randomized controlled trial is needed to further support these interventions.

Additional literature addressing chronic pain after breast cancer treatments focused on pain in the arm and shoulder. Physical therapy interventions such as stretching, active exercise, massage, passive mobilization, strength and coordination training, and postural exercise have been shown in randomized controlled trials to improve symptoms for upper extremity pain

secondary to breast cancer treatment.^{10,11} Aquatic exercise, including low-intensity endurance, core stability, stretching and relaxation, is effective at reducing myofascial neck and shoulder/axillary pain secondary to breast cancer treatment.¹² Based on expert opinion, soft tissue mobilization, postural exercise, pectoral stretching, and scapular strengthening may also be effective in reducing breast pain in this population as well.

Neural Mobilization

Neural mobilization is the facilitation of movement of neural structures through manual techniques or exercise.¹³ It is effective at reducing edema, thermal and mechanical hyperalgesia following nerve injury. A recent systematic review and meta-analysis determined neural mobilization to be effective at treating nerve-related low back pain, nerve-related neck and arm pain, tarsal tunnel syndrome and plantar heel pain.¹³ While accessory joint and neural mobilizations have demonstrated effectiveness in increasing shoulder range of motion after breast cancer surgery, there are no current studies investigating neural mobilization techniques on breast pain.¹⁴ According to expert opinion, neural mobilization techniques of the intercostal branches on the lateral chest wall can be effective at reducing breast pain caused by nerve injury during breast cancer treatment.

Breastfeeding pain: Breast Engorgement/Blocked Ducts/Mastitis

Breastfeeding pain is common amongst new mothers in the first weeks postpartum, and as many as 1 in 5 women may have pain persisting 2 months and beyond. It is often cited as a reason for early cessation of breastfeeding, with one study reporting 29.3% of mothers stopping breastfeeding within the first month due to severe pain.¹⁵ Breast engorgement occurs when the breasts overfill with milk and can lead to symptoms of swelling, hardening, and pain. This most

often occurs the first few days after giving birth but can occur later if the breastfeeding schedule is restricted or the baby is not effectively sucking.¹⁵ Blocked ducts occur when milk is stuck inside of a milk duct, causing a painful or tender lump in the breast, and may occur in conjunction with breast engorgement.¹⁶ Symptoms of blocked ducts can include a localized tender breast lump, redness, warmth of the breast, and pain at the end of the nipple.¹⁷ If uncleared, blocked ducts may lead to non-infective mastitis, which is an inflammation of the breast. Mastitis may also be caused by a bacterial infection, and is accompanied with systemic symptoms of fever, chills and aching. The mastitis discussed in this literature review is non-infective mastitis, which some literature equates to a diagnosis of blocked ducts, and is not accompanied with systemic symptoms.¹⁸

Treatments for pain secondary to Breast Engorgement/Blocked Ducts/Mastitis

Cold Pack Application

Use of cold pack application is a method of cryotherapy, which is the use of cold temperatures for rehabilitation.¹⁹ A cold pack reduces the temperature of the skin and subcutaneous tissues, decreases blood flow to covered area, and reduces pain.¹⁹ A randomized controlled trial by Robson evaluated the effectiveness of applying cold in reducing pain in women with engorgement. The study included 88 women with engorgement 2 days postpartum and found that applying ice in a cloth halter for 15-20 minutes following breastfeeding significantly reduced pain.²⁰ All participants had undergone a cesarean birth which required a longer postpartum hospital stay than vaginal delivery and were able to participate in the study while admitted. The study was only performed over one day, and there was no follow up to determine if these women experienced chronic engorgement or if they continued to use the cold

application once released from the hospital. The study showed no adverse events and the amount of milk transferred from mother to infant was not affected.²⁰ Cold pack application is an effective treatment modality to decrease pain following acute engorgement and is commonly recommended as a method of self-care.¹⁵ Patients must be educated on the appropriate use of cold packs to decrease the risk of severe side effects such as frostbite.²⁰

Ultrasound

Therapeutic ultrasound (TUS) is used as a treatment for breast engorgement and blocked ducts across disciplines. TUS is a deep heating agent that uses an alternating electrical current to convert electrical energy into acoustic energy and transmit it through soft tissue.¹⁹ It has both thermal and nonthermal effects, including acceleration of metabolic rate, reduction of pain, and increased circulation.¹⁹ TUS is thought to work for treatment of engorgement, blocked ducts and mastitis via facilitating milk let-down, which is a reflex that allows milk to flow from the breast, and subsequently decreasing pain and hardness.²¹ Two randomized controlled trials investigated the addition of TUS to the standard care in order to improve symptoms of pain. A RCT by Priyanka et al. with n=80 found significant improvement in pain scores in the TUS intervention group.²² There were four days of treatment (1-4), and the pain scores of the intervention group were significantly lower than the control on days 2-4. The authors did not describe the TUS settings or how frequently participants were treated, which limits this study's reproducibility in the clinic.²² Another RCT by McLachlan et al. with n=109 found significant improvement in pain scores in both the TUS treatment group and the control of sham TUS with no significant differences between groups.²³ TUS was performed from 8-15 minutes based on breast size, and measurements were taken before and after treatment. The significant improvement in both

groups may be attributed to the warmth produced by the sham TUS as well as placebo effect.²³ A retrospective case study by Lavigne et al. of 25 participants found that 23 participants had resolution of pain after TUS. The TUS lasted 8-10 minutes for an average of 3.3 times (range 1-7 sessions.) Pain resolution ranged from immediate to 15 days, with the average resolution happening within 1 week. All but one participant reported performing self-massage, 8 reported use of heat application, and 20 were taking some kind of analgesic (ibuprofen and acetaminophen most common).²⁴ This study suggests TUS may be an effective treatment, but because of the study design the quality of evidence is very low.

All three studies had no adverse events related to the TUS, which suggests this is a safe intervention for women with engorgement. All three studies show significant improvement in pain scores with use of TUS, but the studies by McLachlan et al. and Lavigne et al. do not demonstrate that TUS is more effective than placebo or standard care. Both RCTs were done in the first week postpartum, while the retrospective case study had patients with more chronic engorgement. There is a need for more RCTs done after the immediate postpartum period, as well as different dosing of TUS to determine the most effective treatment.

Breast Massage

Breast massage is a commonly used technique to decrease symptoms of engorgement.²⁴ Using breast massage in engorgement may stimulate the milk ejection reflex, therefore alleviating symptoms.²¹ Women demonstrate improved technique and pain relief after receiving education on breast massage techniques from a professional.²⁵ A case controlled study by Witt et al.²⁵ compared outcomes between an in-office visit with therapeutic breast massage in lactation (TBML) and standard care. The study had 42 participants and 73 case controls. The

intervention group received TBML from a trained clinician, which consisted of focused gentle massage towards the axilla that alternates with hand expression of breast milk. Treatments ranged from 15-60 minutes, with a median massage time of 30 minutes. The intervention group also received standard breastfeeding support, which included latch correction, education on engorgement and feeding patterns, as well as milk supply assessment. The control group received only standard breastfeeding support. After the intervention, breast and nipple pain significantly decreased. At the 2-day follow up survey, 92% of participants reported pain improvement and 43% reported pain resolution. When compared to the control group, there was not a significant difference in pain at the 2-week and 12-week follow ups.²⁵ The control group had significantly less engorgement than the intervention group upon original presentation, which may contribute to the lack of significant difference at the follow ups. Although there was not a significant difference between the intervention and control group, this study still shows promise for TBML for reducing pain symptoms in women with engorgement, blocked ducts, and mastitis. In order for the results to be more powerful, a randomized controlled trial with a larger sample size should be completed.

Multimodal Treatment

Treatment for breastfeeding pain is often multimodal. A prospective cohort study by Cooper and Kowalsky²⁶ evaluated the effects of a comprehensive physical therapy treatment on symptoms of blocked ducts. The 36 participants had blocked ducts for more than 48 hours and were referred to physical therapists by lactation consultants.²⁶ Most participants were seen for 1-2 visits, which were approximately 1 hour and then followed by breastfeeding if possible. The treatment consisted of heat via cervical hydro collar packs applied around involved areas for 10

minutes, ultrasound of 1 MHz frequency, intensity 2.0 W/cm² for 5-6 minutes, and manual techniques of hand expression with therapist performing a gentle rolling motion to help clear the blockage. The treatment also included patient education about breast anatomy, signs of blockage, teaching manual techniques, and positioning tips.²⁶ There were statistically significant improvements in pre and post visual analog scores for measurements of pain, difficulty breastfeeding, and confidence in breastfeeding. This study provides low level evidence that comprehensive physical therapy treatment can be effective at improving outcomes in patients with blocked ducts. More studies examining at individual components of treatment should be done, as well as randomized controlled trials to confirm the results of this study.

Discussion

Overall, there is a paucity of evidence related to conservative measures to treat breast pain. For chronic pain after breast cancer, the available evidence includes a pilot study⁹ and a randomized controlled trial⁴. Both had small sample sizes, n=13 and n=41, and the pilot study included participants that were not specific to a breast cancer diagnosis, which limits relevance.^{4,9} The assessors in the RCT were not blinded, therefore adding bias to the results. The participants in the RCT were overwhelmingly Caucasian, which is not representative of the breast cancer survivor population.⁴ There were no follow up measures provided in the pilot study, but there was significant follow up in the RCT, which supported the intervention of TENS for decreasing chronic pain.^{4,9}

More studies have been done investigating physical therapy modalities for pain due to breastfeeding difficulties. A RCT by Robson evaluating the efficacy of cold pack application had only participants that had a Cesarean section due to the increased hospital stay, which limits

external validity to all breastfeeding women and settings outside of the hospital.²⁰ The research related to TUS for breastfeeding pain from engorgement, blocked ducts, and mastitis is the most robust, including one case series and two RCTs. The case series did not have a control, so the results cannot be solely contributed to the intervention in this study.²⁴ The RCT by Priyanka et al. used convenience sampling from a hospital in India, which limits the external validity of the results.²² This study also had a minimal description of the intervention, which makes the reproducibility and clinical application of this study difficult.²² The RCT by McLachlan et al. is the largest with n=109 and had effective double-blinding to limit the bias of the study.²³ There is one case controlled study supporting therapeutic breast massage in lactation with a small cohort of 42 participants. This study had appropriate follow up measures, but would provide stronger evidence if a RCT was performed to support these results.²⁵ Lastly, the evidence supporting multimodal physical therapy modalities is one prospective pre-test post-test cohort study with an n of 36 participants.²⁶ Since there is no control, the improvement cannot be solely attributed to the interventions. The evidence on physical therapy modalities and interventions for breast pain is lacking and more large RCTs should be done to further investigate the efficacy of the above interventions.

Conclusion

Since many women do not want to undergo drug therapy during breastfeeding or incorporate more medications following breast cancer, conservative measures should be considered when treating breast pain. Unfortunately, there is a lack of research devoted to conservative measure for symptoms of breast pain. For chronic pain secondary to breast cancer treatment, TENS is as effective as placebo at improving symptoms and there is low level

evidence that exercise combined with CBT may improve complaints of chronic pain.^{4,9} Based on contemporary practice methods, neural mobilizations, soft tissue mobilization, postural exercise, pectoral stretching and scapular strengthening may also be utilized to address chronic pain. For symptoms of engorgement, blocked ducts, and mastitis, there is low level evidence that TUS, application of cold packs, TBML, and a comprehensive treatment may be effective at decreasing pain associated with the conditions.²²⁻²⁶

All of the techniques described above are under the scope of physical therapy practice. Due to the nature of the field, many physical therapists may be able to spend longer periods of time with patients than physicians. Because many of these techniques are time consuming and should be performed in conjunction with education on self-management and pain education, physical therapists are highly qualified to administer this treatment in conjunction with patient's care team of lactation consultants, physicians, nurses, and mental health professionals.

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