

PHYSICAL THERAPY ACTIVITY AFTER BREAST CANCER MASTECTOMY: A LITERATURE REVIEW

Atuação fisioterapêutica na mastectomia pós-câncer de mama: uma revisão de literatura

Adrienne Moura Carvalho^{1*} , Gisela Rosa Franco Salerno² 

ABSTRACT

Introduction: Breast cancer is the second most common form of cancer and the leading cause of death by cancer in women. One of the treatments is mastectomy, which brings negative physical and psychological consequences to the lives of these women, significantly reducing their quality of life. **Objective:** To verify the physical therapy procedures most used in the postoperative period of mastectomy. **Methods:** Literature review comprising articles published between 2007 and 2017, through consultation of national and international scientific papers in the following databases: Google Scholar, LILACS, MEDLINE, PubMed and SciELO, taking into account the following keywords: physiotherapy, breast cancer, mastectomy, mammoplasty, quality of life. **Results:** The following modalities were identified: complex decongestive therapy (CDT), manual lymphatic drainage, kinesiotherapy, low power laser, ultrasound, pneumatic compression, manual therapy, Kinesio taping and high voltage electrical stimulation. **Conclusion:** CDT is the most used and effective technique, however, combining several techniques results in a more complete, global and efficient treatment, showing that physical therapy is essential in all phases of treatment and significantly improves the quality of life of women that went through mastectomy.

KEYWORDS: physical therapy specialty; breast cancer; mastectomy; mammoplasty; quality of life.

RESUMO

Introdução: O câncer de mama é o segundo tipo de neoplasia mais frequente e a principal causa de morte por câncer em mulheres. Dentre os tratamentos está a mastectomia, trazendo consequências negativas físicas e psicológicas para a vida dessas mulheres, diminuindo significativamente a sua qualidade de vida. **Objetivo:** Verificar os procedimentos fisioterapêuticos mais utilizados no pós-operatório de mama após cirurgia de mastectomia. **Métodos:** Revisão de literatura entre 2007 e 2017, por meio de consulta a artigos científicos nacionais e internacionais nas seguintes bases de dados: Google Acadêmico, LILACS, MEDLINE, PubMed e SciELO, levando-se em consideração as palavras-chave: fisioterapia, câncer de mama, mastectomia, mamoplastia, qualidade de vida. **Resultados:** Foram levantados 18 artigos, nos quais foram identificadas as seguintes modalidades: terapia complexa descongestiva (TCD), drenagem linfática manual, cinesioterapia, laser de baixa potência, ultrassom, compressão pneumática, terapia manual, *Kinesio taping* e estimulação elétrica de alta voltagem. **Conclusão:** A TCD é a técnica mais utilizada e eficaz, entretanto, a combinação de diversas técnicas leva a um tratamento mais completo, globalizado e eficiente, mostrando que a fisioterapia é essencial em todas as fases do tratamento, melhorando de maneira significativa a qualidade de vida da mulher mastectomizada.

PALAVRAS-CHAVE: fisioterapia; câncer de mama; mastectomia; mamoplastia; qualidade de vida.

¹Universidade Federal de São Paulo (UNIFESP) – Santos (SP), Brazil.

²Universidade Presbiteriana Mackenzie – São Paulo (SP), Brazil.

*Corresponding author: adrienne.mcarvalho@gmail.com

Conflict of interest: nothing to declare

Received on: 02/26/2019. Accepted on: 03/31/2019

INTRODUCTION

Cancer is characterized by disorganized and chaotic cell growth that results from genetic changes inherited or acquired by the action of certain environmental, chemical, radioactive, viral and hormonal agents named carcinogens, which thereby initiate the process of tumorigenesis¹.

Breast cancer is the second most common form of cancer in the world and the leading cause of death by cancer among females. It mainly affects women aged between 40 and 60 years^{1,2}.

The main risk factors are genetics and external, such as environment, living habits, eating habits, age, menarche, exposure to estrogen, radiation, obesity, sedentarism and environmental toxins^{1,2}.

According to the World Health Organization (WHO), about 40% of deaths could be prevented by eliminating or minimizing exposure to carcinogens. Primary prevention consists in promoting health and avoiding external risk factors. Secondary prevention involves actions aimed at early diagnosis of the disease. The main objectives of treatments are to cure, prolong survival and improve the quality of life (QoL) of patients¹.

Primary treatment for breast neoplasm is a surgical intervention called mastectomy, whose goal is tumor removal. The most commonly used surgical procedure is modified radical mastectomy, in which the entire breast is removed, along with axillary lymph nodes^{1,3,4}.

After mastectomy, women face a psychological trauma. These feelings lead them to explore the possibilities of breast reconstruction, in order to reconstitute their body image, with improvements to QoL and well-being, so it should be considered as an integral part of breast cancer treatment⁵.

Treatment-associated morbidities include paresthesia of the axillary region and the lateral wall of the thorax, pain, enlargement of upper limb, reduction of shoulder's range of motion, limitation of daily living activities (DLAs), and interference in QoL⁶.

Patients undergoing physical therapy have their recovery time reduced and return more quickly to their daily, occupational and sports activities, as well as can reacquire movement amplitude, strength, good posture, coordination, self-esteem and, mainly, minimize possible postoperative complications and increase their QoL³.

In the preoperative phase, the work of musculature maintenance is important, besides a previous evaluation of the patient's overall conditions. The post-surgical treatment aims at a significant improvement in skin texture, absence of fibrotic nodulation, reduction of edema, pain relief, minimization of possible tissue adhesions, rapid recovery of areas with hypoesthesia, that is, less of complications and acceleration of patient's return to daily activities^{7,8}.

The main physical therapy resources used to achieve that, are: manual lymphatic drainage, ultrasound, cryotherapy, laser therapy, electrotherapy, active exercises and complex decongestive therapy (CDT), which is fundamental to the recovery process⁷.

Because of the high incidence of breast cancer, and the search for a treatment that ranges from tumor removal surgery to breast reconstruction surgery focusing on significant improvement in QoL, there is a need to verify the most used physical therapy procedures in mastectomy post-operative period.

METHODS

Literature review was carried out in Scholar Google, LILACS, MEDLINE, PubMed and SciELO databases, in search for publications written in Brazilian Portuguese, English and Spanish languages and published from 2007 to 2017, using the following keywords in both Brazilian Portuguese and in English: physiotherapy, breast cancer, mastectomy, mammoplasty, quality of life,

Our search included studies describing the most frequent physical therapy interventions after mastectomy in breast cancer which had been written in Brazilian Portuguese, English or Spanish.

RESULTS

After the full reading of the articles found, we selected the ones meeting the inclusion criteria.

When selecting and analyzing the material, a table was drawn up with the following information of studies: author, year, journal, journal impact factor, study's objectives, procedures and results.

Eighteen articles describing the most frequent physical therapy modalities after mastectomy surgery were selected (Table 1).

DISCUSSION

Breast cancer is the second most common cancer worldwide. About 22% of new cases are accounted each year, corresponding to a significant number of deaths among adult women^{2,27}.

In Brazil, cancer is considered a serious public health problem due to gradual increase in incidence and mortality²⁸.

Concomitant to medical treatment, a multidisciplinary approach is required, considering not only pathological conditions, but also physical, psychological, social and professional rehabilitation, aiming at maintaining and improving the QoL of patients. Hence, physical therapy plays a fundamental role in this stage of treatment for mastectomized women, since it can help in early functional recovery and in the prophylaxis of sequelae, in addition to reducing recovery time, thus collaborating with women's reintegration into society without functional limitations³.

After surgery, the patient may present, among other complications, upper limb lymphedema. Signs and symptoms associated with lymphedema are: increased limb diameter, tightening of the skin, stiffness, decreased motion range, sensory disturbances and impairment of functional tasks²⁵.

Table 1. List of studies per title, author, year of publication, journal, impact factor, study objective, procedures and results.

Paper	Author, year, journal, impact factor	Objective	Procedures	Results
"Análise dos efeitos da drenagem linfática manual no tratamento do linfedema pós-mastectomia"	Marques et al., 2015 ⁹ <i>Rev. Saúde & Ciência em Ação</i> , B1	To verify the effects of manual lymphatic drainage in the treatment of post-mastectomy lymphedema	Literature review	Manual lymphatic drainage is effective in the treatment of lymphedema and, when associated with other techniques such as complex decongestive therapy, produces better results
"Fisioterapia descongestiva no linfedema de membros superiores pós-mastectomia: estudo retrospectivo"	Tacani et al., 2013 ¹⁰ <i>Revista Brasileira de Ciências da Saúde</i> , B4	To evaluate the effects of complex decongestant therapy on upper limb lymphedema in late postoperative breast cancer patients	Retrospective study of 44 medical charts evaluating pain, perimetry, volume and sensitivity	Reduction of lymphedema and other symptoms such as pain and altered sensitivity were observed after complex decongestive therapy
"Atenção fisioterapêutica no controle do linfedema secundário ao tratamento do câncer de mama: rotina do Hospital do Câncer III/Instituto Nacional de Câncer"	Fabro et al., 2016 ¹¹ <i>Rev. Bras. Mastologia</i> , B3	To report actions adopted in the Physical Therapy Service of Hospital do Câncer III, in patients submitted to treatment for breast cancer	Descriptive analysis	Treatment at Hospital do Câncer III involves the combination of external compression (compression bandaging or use of compressive meshes), active kinesiotherapy and skin care
"O uso da cinesioterapia no pós-operatório de cirurgias plásticas"	Silva et al., 2013 ¹² <i>Ter. Man.</i> , B2	To suggest kinesiotherapy approach for the postoperative period of esthetic plastic surgeries	Systematic review	<ul style="list-style-type: none"> - inflammatory phase: stretching and relaxation of musculature, breathing exercises; - proliferative phase: sensorial stimulation, passive movement; - remodeling phase: active movement of the glenohumeral joint
"Influências do exercício físico na qualidade de vida em dois grupos de pacientes com câncer de mama"	Castro Filha et al., 2016 ¹³ <i>Rev. Bras. Ciênc. Esporte</i> , B1	To investigate the relationship between physical exercise and its effects on the quality of life of patients with breast cancer, post-surgery (six months)	24 women, divided into 2 groups (control and experimental) (most resisted aerobic exercises), 3 times a week, for 10 weeks	The practice of physical exercise after surgery contributes to the improvement of psychological, social and physical aspects
"Ultrasound therapy and transcutaneous electrical neuromuscular stimulation for management of post-mastectomy upper limb lymphedema"	Sousa et al., 2014 ¹⁴ <i>Acta Fisiatr.</i> , B3	To evaluate the effects of transcutaneous electrical stimulation or ultrasound therapy in the treatment of upper limb lymphedema after mastectomy	Literature review (1980-2012)	Little improvement was observed when it comes to pain reduction or quality. Only the study using ultrasound therapy identified small reduction in symptoms
"Análise de técnicas fisioterapêuticas utilizadas em pacientes submetidas à mastectomia: uma revisão integrativa"	Lira et al., 2016 ¹⁵ <i>ConScientia e Saúde</i> , B2	To identify the features mostly used and their most significant results in the recovery of mastectomized patients	Literature review	The studies showed the important role of physical therapy to prevent complications and improve or maintain functionality and quality of life. Kinesiotherapy was the most used resource
"Liberação miofascial em pacientes com mastectomia"	Nardi et al., 2014 ¹⁶ <i>Fisioterapia Brasil</i> , B3	To review the literature as for the effects of myofascial release on the pain of mastectomized patients	Literature review (2001-2012)	The method is efficient to improve myofascial pain reported in the postoperative period of mastectomy
"Efeitos das técnicas de terapia manual no tratamento da dor em pacientes pós-mastectomizadas: revisão sistemática"	Basilio et al., 2014 ¹⁷ <i>Manual Therapy, Posturology & Rehabilitation Journal</i> , B1	To verify the effects of manual therapy in patients after mastectomy surgery	Systematic review (2009-2013)	Manual therapy techniques bring significant results in the relief of muscular pain

Continue...

Table 1. Continuation.

Paper	Author, year, journal, impact factor	Objective	Procedures	Results
"Efficacy of pneumatic compression and low-level laser therapy in the treatment of postmastectomy lymphoedema: a randomized controlled trial"	Kozanoglu et al., 2009 ¹⁸ <i>Clin. Rehabil.</i> , A1	To compare the long-term efficacy of pneumatic compression and low-power laser therapy in the treatment of post-mastectomy lymphedema	Patients were allocated to group I (2 hours of pneumatic compression therapy, totaling 20 sessions for 4 weeks) and group II (20 minutes of low power laser therapy, totaling 12 sessions for 4 weeks)	Both interventions had positive effects, but the improvement observed in the group treated with laser was more significant after 12 months (in the long term)
"Recursos fisioterapêuticos em linfedema pós-mastectomia: uma revisão de literatura"	Luz e Lima, 2011 ¹⁹ <i>Fisioter. Mov.</i> , B2	To identify and evaluate the benefits of physical therapy resources in the treatment and prevention of post-mastectomy lymphedema	Literature review	Physical therapy remains the most efficient choice to treat lymphedema, as it not only improves, but also maintains the functionality of lymphatic circulation, in addition to preventing relapses of infections
"Efeitos do Kinesio taping sobre o edema linfático"	Pivetta et al., 2017 ²⁰ <i>Fisioterapia Brasil</i> , B3	Investigating the effects of Kinesio taping on lymphatic edema	Document exploratory research with quantitative approach	Significant reduction of lymphedema in the groups that used Kinesio taping, both alone and associated with other techniques
"Effectiveness of a self-administered, home-based exercise rehabilitation program for women following a modified radical mastectomy and axillary node dissection: a preliminary study"	Kilgour et al., 2008 ²¹ <i>Breast Cancer Res. Treat.</i> , A1	To evaluate the efficacy of a home exercise program, by means of video lessons, on the rehabilitation of shoulder mobility after radical mastectomy	27 women randomly allocated in two groups and following a home rehabilitation program (11 days), with flexibility and stretching exercises	Significant increase in shoulder flexion, abduction, external rotation and grip strength
"Efeitos da estimulação elétrica de alta voltagem no linfedema pós-mastectomia bilateral: estudo de caso"	Garcia et al., 2007 ²² <i>Fisioter. Pesq.</i> , B2	To analyze the effects of high voltage pulsed electrical stimulation on upper limb lymphedema in patients submitted to bilateral mastectomy	The treatment consisted of electrical stimulation for 20 minutes, during 7 weeks, totalizing 14 sessions. The evolution of treated limbs was analyzed by perimetry and volumetry, comparing the first and the fourteenth sessions	Significant reduction in lymphedema, improvement in overall picture related to increased mobility and decreased sensation of weight
"Linfedema pós-câncer de mama: comparação de duas técnicas fisioterapêuticas – estudo piloto"	Leal et al., 2011 ²³ <i>Fisioter. Mov.</i> , B2	To compare the effects of complex decongestive therapy with a protocol that includes electrical stimulation, therapeutic exercises and use of the elastic clamp aimed at reducing lymphedema	Two groups submitted to different therapeutic protocols, complex decongestive therapy and electrical stimulation twice a week for seven weeks	Both the complex decongestive therapy and the protocol with electrical stimulation were not effective to reduce residual lymphedema secondary to axillary lymph node dissection. However, they provided for the maintenance of measures evaluated
"Efficacy of complete decongestive therapy and manual lymphatic drainage on treatment related lymphedema in breast cancer"	Koul et al., 2007 ²⁴ <i>Int. J. Radiat. Oncol. Biol. Phys.</i> , A1	To evaluate the results of complex decongestive and MLD therapy in patients with breast cancer-related lymphedema	Patients were divided according to treatment modalities; complex decongestive therapy (55%), MLD (32%) and home exercise program (13%).	Complex decongestive therapy and MLD associated with exercise caused significant reduction in lymphedema volume

Continue...

Table 1. Continuation.

Paper	Author, year, journal, impact factor	Objective	Procedures	Results
"Tratamientos fisioterapéuticos para el linfedema después de la cirugía de cáncer de seno: una revisión de literatura"	Leal et al., 2009 ²⁵ <i>Rev. Latino-Am Enfermagem</i> , A1	To present the modalities of physical therapy applied in the treatment of lymphedema	Literature review	Results are better when the techniques are associated. Decongestive therapy is the most widely used protocol
"Fisioterapia para o tratamento do linfedema no pós-operatório de mastectomia: revisão de literatura"	Pacheco et al., 2011 ²⁶ <i>Rev. Fac. Ciênc. Méd. Sorocaba</i> , B5	To verify the importance of physical therapy in the reduction of lymphedema after surgical treatment of breast cancer	Bibliography review	Physical therapy is important at all stages of treatment. However, the best results are achieved when there is early intervention by the physical therapy team

MLD: manual lymphatic drainage.

Marques et al.⁹ reported the importance of manual lymphatic drainage (MLD) in the treatment of lymphedema, resulting in its reduction, improvement of sensitivity and range of motion, and reduction of cicatricial adhesions, providing an improvement in the patient's QoL. It has been proven effective and, when associated with other techniques such as CDT, achieved better results.

Reduction of lymphedema observed by Tacani et al.¹⁰ was due to the use of CDT, which consists of combined use of MLD, skin care, compression bandaging, kinesiotherapy and self-massage. When supplemented by manual techniques, vacuum therapy, transcutaneous electrical nerve stimulation (TENS), and adapted therapeutic exercises, it also improved cicatricial adhesions. Brito et al.²⁹ highlighted that, in most treatment programs, lymphedema treatment is based on CDT.

Kinesio taping has been used as an innovative resource in the treatment of lymphedema, as it can drain body fluids. Pivetta et al.²⁰ reported a significant reduction of lymphedema in groups that used Kinesio taping either alone or in association with other techniques.

High-voltage stimulation may increase venous blood flow and edema absorption, since negative polarity has sufficient intensity to provide muscle contractions, producing a pump effect in lymphatic flow^{22,23}.

A study by Garcia et al.²², using high-voltage stimulation, showed significant reduction in lymphedema, as well as reports by the volunteers of improvement in their overall picture when it comes to increased mobility and decreased weight sensation.

Mastectomized patients should be encouraged to maintain unrestricted exercise, performing resistance training with fewer repetitions and lower load on the affected limb, or with lymphedema. Associating exercises with relaxation techniques, to

provide patients with both physical and emotional improvement, brings benefits to treatment of lymphedema²⁹.

Practicing physical exercise during cancer treatment has contributed with improvements in psychological, social and physical aspects of patients; however, it is important to consider which exercises can be performed by this public¹³. The knowledge about benefits of physical therapy and the resources offered by the physical therapist is still limited, especially when it comes to the preoperative period, since Flores et al.³⁰ verified that the frequency of referrals of patients by plastic surgeons to physical therapists was 40 and 90% in the pre- and postoperative periods, respectively.

Pacheco et al.²⁶ emphasized the importance of physical therapy in all recovery phases of mastectomized women. However, the best results occur when there is early intervention by the physical therapy team.

In conclusion, CDT was proven the most used and efficient technique. However, combining several techniques leads to a more complete, global and efficient treatment, thus showing that physical therapy is essential in all phases of treatment, that is, in the preoperative and postoperative periods, significantly improving the QoL of mastectomized women.

ACKNOWLEDGEMENTS

This work would not have been possible without the collaboration, stimulation and commitment of my family and my academic advisor. I would like to express my gratitude and appreciation to everyone directly or indirectly contributed to making this work a reality. To all of you, my sincere "thank you".

REFERENCES

- Rodrigues JCJ, Silva LCF, Cardoso RA. Câncer de mama: do diagnóstico ao tratamento. *Revista Master*. 2016;1(1):49-56.
- Pereira BMB, Guedes CMF, Machado CAC. Terapia hormonal e câncer de mama. *Rev Bras Mastologia*. 2017;27(1):15-20.

3. Jammal MP, Machado AM, Rodrigues LR. Fisioterapia na reabilitação de mulheres operadas por câncer de mama. *O Mundo da Saúde São Paulo*. 2008;32(4):506-10.
4. Vaz AS, Souza JR, Silva CA, Monteiro LHB, Oliveira MV, Arcanjo GRG, et al. Qualidade de vida da mulher pós-mastectomia: Revisão Integrativa Brasileira. *Enciclopédia Biosfera*. 2015;11(20):697-707.
5. Sousa JCMN. Opções de Reconstrução mamária após Mastectomia total: indicações, vantagens e desvantagens [dissertação]. Porto: Faculdade de Medicina, Universidade do Porto; 2010.
6. Velloso FSB, Barra AA, Dias RC. Morbidade de membros superiores e qualidade de vida após a biópsia de linfonodo Sentinela para o tratamento de Câncer de Mama. *Rev Bras Cancerologia*. 2009;55(1):75-85.
7. Milani GB, João SMA, Farah EA. Fundamentos da Fisioterapia dermato-funcional: revisão de literatura. *Fisioterapia e Pesquisa*. 2006;13(1):37-43. <https://doi.org/10.1590/fpusp.v13i1.76159>
8. Santos LP, Cândido RCPG, Silva KCC. Fisioterapia dermatofuncional no pós-operatório de abdominoplastia: revisão de literatura. *Rev Amazônia*. 2013;1(2):44-55.
9. Marques JF, Martins PCML, Machado ER, Souza LM, Rodrigues JHA. Análise dos Efeitos da Drenagem Linfática Manual no Tratamento do Linfedema Pós-Mastectomia. *Saúde Ciênc Ação*. 2015;1(1).
10. Tacani PM, Camargo RAC, Silva G, Moreira BC, Batista PAN, Montezello D, et al. Fisioterapia descongestiva no linfedema de membros superiores pós-mastectomia: estudo retrospectivo. *Rev Bras Ciênc Saúde*. 2013;11(37). <http://dx.doi.org/10.13037/rbcs.vol11n37.1884>
11. Fabro EAN, Costa RM, Oliveira JF, Lou MBA, Torres DM, Ferreira FO, et al. Atenção fisioterapêutica no controle do linfedema secundário ao tratamento do câncer de mama: rotina do Hospital do Câncer III/Instituto Nacional de Câncer. *Rev Bras Mastologia*. 2016;26(1):4-8.
12. Silva RMV, Cordeiro LF, Figueiredo LSM, Almeida RAL, Meyer PF. O uso da cinesioterapia no pós-operatório de cirurgias plásticas. *Ter Man*. 2013;11(51):129-34.
13. Castro Filha JGL, Miranda AKP, Martins Júnior FF, Costa HA, Figueiredo KRFV, Oliveira Junior MNS, et al. Influências do exercício físico na qualidade de vida em dois grupos de pacientes com câncer de mama. *Rev Bras Ciênc Esporte*. 2016;38(2):107-14. <http://dx.doi.org/10.1016/j.rbce.2015.11.008>
14. Sousa MAG, Cecatto RB, Rosa CDP, Brito CMM, Battistella LR. Ultrasound therapy and transcutaneous electrical neuromuscular stimulation for management of post-mastectomy upper limb lymphedema. *Acta Fisiatr*. 2014;21(4):189-94. <https://doi.org/10.5935/0104-7795.20140037>
15. Lira NG, Barros MFA, Carvalho AGC, Araújo MGR, Lucena NMG. Análise de técnicas fisioterapêuticas utilizadas em pacientes submetidas à mastectomia: uma revisão integrativa. *ConScientiae Saúde*. 2016;15(2):304-11. <https://doi.org/10.5585/ConsSaude.v15n2.6163>
16. Nardi AT, Nora DD, Petter GN, Santos TS, Braz MM. Liberação miofascial em pacientes com mastectomia. *Fisioterapia Brasil*. 2014;15(3).
17. Basilio FB, Anjos RMM, Medeiros EP, Melo EMF, Silva RMV. Efeitos das técnicas de terapia manual no tratamento da dor em pacientes pós-mastectomizadas: revisão sistemática. *MTP Rehab J*. 2014;12:196-201.
18. Kozanoglu E, Basaran S, Paydas S, Sarpel T. Efficacy of pneumatic compression and low-level laser therapy in the treatment of postmastectomy lymphoedema: a randomized controlled trial. *Clin Rehabil*. 2009;23(2):117-24. <https://doi.org/10.1177/0269215508096173>
19. Luz ND, Lima ACG. Recursos fisioterapêuticos em linfedema pós-mastectomia: uma revisão de literatura. *Fisioter Mov*. 2011;24(1):191-200. <http://dx.doi.org/10.1590/S0103-51502011000100022>
20. Pivetta HMF, Petter GN, Penna GB, Martins TNO, Santos LF, Pautz ACG. Efeitos do Kinesio Taping sobre o edema linfático. *Fisioterapia Brasil*. 2017;18(3):382-90.
21. Kilgour RD, Jones DH, Keyserlingk JR. Effectiveness of a self-administered, home-based exercise rehabilitation program for women following a modified radical mastectomy and axillary node dissection: a preliminary study. *Breast Cancer Res Treat*. 2008;109(2):285-95. <https://doi.org/10.1007/s10549-007-9649-x>
22. Garcia LB, Guirro ECO, Montebello MIL. Efeitos da estimulação elétrica de alta voltagem no linfedema pós-mastectomia bilateral: estudo de caso. *Fisioter Pesq*. 2007;14(1).
23. Leal NFBS, Dias LAR, Carrara HHA, Ferreira CHJ. Linfedema pós-câncer de mama: comparação de duas técnicas fisioterapêuticas – estudo piloto. *Fisioter Mov*. 2011;24(4):647-54. <http://dx.doi.org/10.1590/S0103-51502011000400008>
24. Koul R, Dufan T, Russell C, Guenther W, Nugent Z, Sun X, et al. Efficacy of complete decongestive therapy and manual lymphatic drainage on treatment related lymphedema in breast cancer. *Int J Radiat Oncol Biol Phys*. 2007;67(3):841-6. <https://doi.org/10.1016/j.ijrobp.2006.09.024>
25. LealNFBS, CarraraHHA, VieiraKF, FerreiraCHJ. Tratamientos fisioterapêuticos para el linfedema después de la cirugía de cáncer de seno: una revisión de literatura. *Rev Latino-Am Enfermagem*. 2009;17(5).
26. Pacheco MN, Detoni Filho A, Melo DAS. Fisioterapia para o tratamento do linfedema no pós-operatório de mastectomia: revisão de literatura. *Rev Fac Ciênc Méd*. 2011;13(4):4-7.
27. Ohl ICB, Ohl RIB, Chavaglia SRR, Goldman RE. Public actions for control of breast cancer in Brazil: integrative review. *Rev Bras Enferm*. 2016;69(4):746-55. <http://dx.doi.org/10.1590/0034-7167.2016690424i>
28. Santana CS, Galvão GG, Costa PMC, Tavares MFL. Geração de trabalho e renda como estratégia de Promoção da Saúde: o caso das mulheres mastectomizadas em Nova Iguaçu, RJ, Brasil. *Ciênc Saúde Coletiva*. 2016;21(6):1921-30. <http://dx.doi.org/10.1590/1413-81232015216.07932016>
29. Brito CMM, Lourenço MIP, Saul M, Bazan M, Otsubo PPS, Imamura M, et al. Câncer de mama: reabilitação. *Acta Fisiatr*. 2012;19(2):66-72. <https://doi.org/10.5935/0104-7795.20120013>
30. Flores A, Brum KO, Carvalho RM. Análise descritiva do encaminhamento médico a tratamentos fisioterapêuticos dermato-funcionais nos períodos pré e pós-operatório de cirurgias plásticas cosméticas. *O Mundo da Saúde*. 2011;35(4):308-14. <https://doi.org/10.15343/0104-7809.2011354308314>