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REVISÃO SISTEMÁTICA E METANÁLISE DE INTERVENÇÕES FISIOTERAPÊUTICAS EM MULHERES COM CÂNCER DE MAMA SUBMETIDAS À RECONSTRUÇÃO MAMÁRIA

SYSTEMATIC REVIEW AND META ANALYSIS OF PHYSIOTHERAPEUTIC INTERVENTIONS IN WOMEN WITH BREAST CANCER SUBMITTED TO BREAST RECONSTRUCTION

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Dissertação apresentada à Faculdade de Ciências Médicas da Universidade Estadual de Campinas como parte dos requisitos exigidos para a obtenção do título de Mestra em Ciências da Saúde, na área de Oncologia Ginecológica e Mamária.

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ORIENTADOR: PROF. DR. LUIS OTÁVIO ZANATTA SARIAN

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“Amar e mudar as coisas me interessa mais”

Belchior

RESUMO

Introdução: A reconstrução mamária é uma parte valiosa do tratamento do câncer de mama, contribuindo para a melhora da imagem corporal, autoestima e qualidade de vida das mulheres. No entanto, não está isenta de sequelas, como distúrbios cicatriciais, edema, dor, restrição da amplitude de movimento de ombro e alterações biomecânicas. A fisioterapia pode colaborar na prevenção e melhora de complicações relacionadas à reconstrução mamária. Porém, ainda não há consenso na literatura científica sobre qual o momento ideal para iniciar esta prática e qual a melhor técnica a ser utilizada. **Objetivo:** Realizar uma revisão sistemática da literatura sobre as intervenções fisioterapêuticas utilizadas na prevenção de distúrbios físico funcionais em mulheres com câncer de mama submetidas à reconstrução mamária. **Métodos:** Revisão sistemática da literatura e meta-análise registrada no PROSPERO e seguindo os critérios do PRISMA. A busca foi realizada nas principais bases de dados em saúde (PubMed, PubMed PMC, BVS/BIREME, EBSCOhost, Scopus, Web of Science, Embase, Cochrane Library, PEDro), nos registros de ensaios clínicos e literatura cinzenta, sem restrições de linguagem e ano. Os estudos incluídos deveriam ser ensaios clínicos randomizados ou quase randomizados, ensaios clínicos controlados e estudos observacionais. As técnicas fisioterapêuticas poderiam ser com ou sem supervisão, envolvendo exercícios, alongamentos, técnicas de terapia manual, dentre outros. A extração de dados envolveu coleta de questionários de qualidade de vida, funcionalidade, dor, amplitude de movimento e força muscular dos membros superiores, efeitos adversos e tempo de seguimento. **Resultados:** Foram identificados 1191 estudos e selecionados 5 para análise qualitativa, totalizando 372 participantes. As intervenções fisioterapêuticas foram exercícios abdominais, exercícios ativos de

membros superiores, massagem e meditação. O início da fisioterapia variou de 3 meses antes da cirurgia até 15 ou 30 dias após. Os estudos apontaram diferenças significativas na funcionalidade, amplitude de movimento e dor. **Meta-análise:** A meta-análise dos estudos revelou que o início precoce de exercícios ativos de membros superiores no pós-operatório de reconstrução mamária é melhor para a amplitude de movimento na flexão e abdução dos membros superiores. **Conclusão:** Nosso resultado sugere que iniciar exercícios ativos de membro superior com 15 dias de pós-operatório é seguro e tem mais benefícios que o início tardio em mulheres que realizaram reconstrução mamária por câncer de mama. No entanto, a qualidade metodológica dos estudos revisados é questionável e apenas alguns aspectos da recuperação pós operatória foram adequadamente estudados; desta forma, propomos a realização de um ensaio clínico randomizado, comparando o início precoce versus tardio de exercícios ativos, exclusivos ou associados à terapia manual.

Palavras chaves: neoplasias da mama; mamoplastia; modalidades de fisioterapia; exercício; reabilitação.

ABSTRACT

Introduction: Breast reconstruction is a valuable part in the treatment of breast cancer, contributing to the improvement of women's body image, self-esteem and quality of life. However, it is not exempt from sequelae, such as scar disorders, edema, pain, restriction of shoulder range of motion and biomechanical changes. Physiotherapy can help prevent and improve complications related to breast reconstruction. However, there is still no consensus in the scientific literature on the ideal time to start this practice and the best technique to be used. **Objective:** To systematically review the literature on physical therapy interventions used to prevent physical and functional disorders in women with breast cancer undergoing breast reconstruction. **Methods:** Systematic review of the literature and meta-analysis registered in PROSPERO and following the PRISMA criteria. The search was performed in the main healthcare databases (PubMed, PubMed PMC, BVS/BIREME, EBSCOhost, Scopus, Web of Science, Embase, Cochrane Library, PEDro), clinical trial records and gray literature, without language restrictions. and year. Included studies should be randomized or quasi-randomized clinical trials, controlled clinical trials, and observational studies. The physiotherapeutic techniques could be with or without supervision, involving exercises, stretching, manual therapy techniques, among others. Data extraction involved collecting quality of life questionnaires, functionality, pain, range of motion and upper limb muscle strength, adverse effects and follow-up time. **Results:** 1191 studies were identified and 5 selected for qualitative analysis, totaling 372 participants. The physical therapy interventions were abdominal exercises, active upper limb exercises, massage and meditation. The start of physical therapy ranged from 3 months before surgery to 15 or 30 days after surgery. The studies showed significant differences in functionality, range of motion

and pain. **Meta-analysis:** The meta-analysis of the studies revealed that early initiation of active upper limb exercises in the postoperative period of breast reconstruction is better for the range of motion in flexion and abduction of the upper limbs. **Conclusion:** Our results suggest that starting active upper limb exercises 15 days after surgery is safe and has more benefits than a late start in women who underwent breast reconstruction for breast cancer. However, the methodological quality of the studies reviewed is questionable and only some aspects of postoperative recovery were adequately studied; therefore, we propose to carry out a randomized clinical trial, comparing the early versus late start of active exercises, exclusive or associated with manual therapy.

Key words: breast neoplasms; mammaplasty; physical therapy modalities; exercise therapy; rehabilitation.

LISTA DE ABREVIATURAS E SIGLAS

BIREME – Biblioteca Regional de Medicina

BDTD – Biblioteca Digital Brasileira de Teses e Dissertações

BR – *Breast reconstruction*

BVS – Biblioteca Virtual em Saúde

CCT – *Controlled clinical trials*

DASH – *Disabilities of the Arm, Shoulder, and Hand*

DIEP – *Deep inferior epigastric perforator*

ECC – Ensaio clínico controlado

ECR – Ensaio clínico randomizado

GRADE – *Grading of Recommendations Assessment, Development and Evaluation*

INCA – Instituto Nacional de Câncer

MA – *Meta-analysis*

PEDro – *Physiotherapy Evidence Database*

PRISMA – *Preferred Reporting Items for Systematic Reviews and Meta-Analysis*

PROSPERO – *International prospective register of systematic review*

Quase-ECR – Ensaio clínico quase randomizado

Quasi-RCT – *Quasi-randomised clinical trials*

QOL – *Quality of life*

RCT – *Randomized controlled trials*

RMI – Reconstrução mamária imediata

RoB 2 – *Risk of Bias 2*

ROM – *Range of motion*

SR – *Systematic Review*

UFMG – Universidade Federal de Minas Gerais

WHCRA – *Women's Health and Cancer Rights Act*

SUMÁRIO

1. INTRODUÇÃO

O câncer de mama é a neoplasia mais prevalente em mulheres e é a segunda maior causa de morte por câncer no mundo (1–3). A incidência estimada para o ano de 2021 foi de aproximadamente 2,3 milhões de casos novos no mundo. No Brasil, para o triênio 2023-2025, foram estimados 74 mil novos casos por ano (4). O tratamento inclui abordagens locais, através de cirurgia, associada ou não a reconstrução mamária, radioterapia e abordagens sistêmicas com a quimioterapia, hormonioterapia e terapia biológica (5). A cirurgia é necessária na maior parte dos casos, sendo que de 28 a 60% das mulheres realizam a mastectomia, retirando toda a mama (6). Apesar de ser uma importante ferramenta no tratamento do câncer de mama, a mastectomia traz efeitos negativos como: incapacidades físicas, diminuição da qualidade de vida, alterações emocionais e de função sexual, alteração da imagem corporal e autoestima (7,8).

A reconstrução mamária imediata (RMI) tem se mostrado eficaz para melhorar a imagem corporal e qualidade de vida destas mulheres (9). Além disso, alguns estudos já mostram seus efeitos na autoimagem, sexualidade e distúrbios psicológicos, como a angústia relacionada à mastectomia (7,9,10). As taxas de RMI têm crescido muito nos últimos anos (11). Um estudo mostrou uma taxa de 37,8% de RMI (12). Desde 1998 foi instituída uma lei federal nos EUA onde mulheres em tratamento para o câncer de mama têm direito a RMI (12). No Brasil, a RMI é garantida por lei pelo Ministério da Saúde, desde 2013, às mulheres em tratamento por câncer de mama (13).

Independentemente do momento em que a reconstrução mamária é realizada, imediatamente após a mastectomia ou tardiamente, esta pode ser feita

com tecido autólogo (do próprio corpo) ou heterólogo (implantes) (6). Ambos proporcionam muitos benefícios às mulheres, mas não estão isentos de riscos e complicações como distúrbios cicatriciais (necrose do retalho e deiscência), edema, dor, restrição da amplitude de movimento do ombro, além de alterações biomecânicas de músculos e articulações (14–16). Alguns estudos mostram ainda complicações específicas de acordo com o tipo de abordagem realizada (6).

O uso de implantes pode estar relacionado a complicações como contratura capsular, infecção, hematoma, seroma e ruptura do implante (6). Dentre as cirurgias realizadas com tecidos autólogos, o uso de retalho do músculo reto abdominal está associado com diminuição de força muscular do abdômen, dor lombar baixa e alterações posturais (15,17,18). Já no uso do músculo grande dorsal como retalho, há comprometimento da coluna vertebral podendo acarretar escoliose, hipercifose, rotação das vértebras, dor, e redução da força de extensão do ombro e manguito rotador (19,20). Apesar das vantagens que a RMI pode oferecer, deve-se levar em consideração os impactos que estas complicações têm sobre a qualidade de vida, capacidades físicas e estresse psicológico nessas mulheres, podendo inclusive atrasar o início de tratamentos adjuvantes (11,14,21).

A fisioterapia tem demonstrado importante papel na prevenção e melhora da qualidade de vida, amplitude de movimento do ombro, dor, percepção física, ansiedade, função emocional e social, durante e após o tratamento de câncer de mama (22–24). Diversas técnicas podem ser utilizadas como a terapia manual, alongamentos, fortalecimento muscular, liberação miofascial, mobilização tecidual, drenagem linfática manual, exercícios passivos e ativos livres supervisionados ou monitorados à distância (22–28). Essas técnicas têm se mostrado efetivas no pós-operatório de cirurgias no tratamento do câncer de mama. Serra-añó concluiu

em seu estudo que a liberação miofascial pode auxiliar na mobilidade e funcionalidade do ombro e percepção da dor (29). Outro estudo comparou exercícios ativos com a drenagem linfática manual no pós-operatório de mastectomia radical por câncer de mama observando que não há diferença quanto à presença de complicações e a amplitude de movimento do ombro (30). Estudos recentes também têm mostrado que o monitoramento de exercícios à distância através de aplicativos de celular ou mesmo ligações telefônicas são uma excelente forma de manter a funcionalidade e qualidade de vida durante o tratamento do câncer (31,32).

Assim como no pós-operatório de mastectomia radical, a atuação fisioterapêutica em mulheres submetidas à cirurgia de reconstrução mamária é de extrema importância, como parte fundamental de uma equipe multidisciplinar, exigindo atendimento especializado e o mais precoce possível seja no pré ou pós-operatório (15). Através de orientações, avaliação e tratamento das disfunções musculoesqueléticas, além de prescrição individualizada de exercícios é possível restaurar as funções pré-operatórias, prevenir e tratar as complicações, iniciando a reabilitação pós-operatória precocemente (15,26,33,34).

Alguns estudos mostram a utilização de técnicas no pós-operatório de RMI como a massagem terapêutica, a yoga, exercícios e orientações domiciliares, para melhora da ansiedade, depressão, qualidade de vida, dor, amplitude de movimento, dentre outros benefícios (33,35–37). O estudo de Woo et al. acompanhou 420 mulheres, que realizaram RMI, durante 52 meses para avaliar a incidência e os fatores de risco associados à morbidade do ombro no pós-operatório, e observaram que a fisioterapia reduz esse risco sugerindo que a reabilitação seja iniciada precocemente (34). Outro estudo comparou, de forma retrospectiva, dois

grupos iniciando a reabilitação em momentos diferentes (2 e 4 semanas) do pós-operatório de RMI com implante expansor, concluindo que o início precoce oferece uma recuperação mais rápida da amplitude de movimento do ombro sem aumento do risco de complicações no sítio cirúrgico ou dor (33). Corroborando esses achados, o ensaio clínico realizado por Rizzi et al. demonstrou segurança e efetividade em iniciar a intervenção fisioterapêutica no 15º dia de pós-operatório de RMI com implantes utilizando um protocolo de exercícios com amplitude de movimento livre (38).

Os exercícios ativos parecem promissores para a reabilitação de mulheres no pós-operatório precoce de RMI (38). Outra técnica que tem demonstrado bons resultados é a terapia manual (37,39). Utilizando o deslizamento dos tecidos e fáscias do corpo junto a manobras de mobilização articular, é possível melhorar a amplitude de movimento do ombro, liberar aderências cicatriciais e aumentar a circulação sanguínea local oxigenando os tecidos para melhor cicatrização (40–42). Mesmo com os inúmeros benefícios dessa técnica, existem poucos estudos utilizando a terapia manual no pós-operatório de RMI. Uma revisão de literatura mostrou o papel do fisioterapeuta dentre as diversas abordagens da RMI, porém o autor traz a dificuldade em estabelecer qual a melhor intervenção fisioterapêutica a ser realizada no pós-operatório (15).

Até o atual momento não foram encontradas revisões sistemáticas de alta qualidade que investiguem a atuação da fisioterapia em diferentes momentos do pós-operatório e com diferentes tipos de intervenção. As diretrizes brasileiras diagnósticas e terapêuticas do carcinoma de mama, que garantem a RMI, também não são claras quanto à atuação fisioterapêutica no pré e pós-operatório dessas cirurgias e quando deve ser oferecida (43).

Como consequência da ausência de um consenso sobre qual a melhor abordagem e quando iniciar a atuação fisioterapêutica no pós-operatório de mulheres submetidas à RMI por câncer de mama, muitos profissionais podem se sentir despreparados e inseguros em seus atendimentos, assim como há um receio por parte dos médicos em indicar a reabilitação precoce (33). Além disso, o início tardio da reabilitação pode estar associado ao aparecimento de complicações físicas, retardando o início de tratamentos adjuvantes e prejudicando a qualidade de vida dessas mulheres (33). Diante disso, se faz necessária a busca por medidas e técnicas efetivas que assegurem a atuação fisioterapêutica com segurança no pós-operatório precoce de mulheres submetidas à RMI visando prevenir e diminuir complicações físico-funcionais.

2. OBJETIVOS

2.1 Objetivo geral

Realizar uma revisão sistemática da literatura sobre as intervenções fisioterapêuticas utilizadas na prevenção de distúrbios físico funcionais em mulheres com câncer de mama submetidas à reconstrução mamária.

2.2 Objetivos específicos

- Descrever os tipos de intervenções fisioterapêuticas utilizados em mulheres com câncer de mama submetidas à reconstrução mamária.
- Investigar os desfechos das intervenções fisioterapêuticas na funcionalidade, amplitude de movimento do ombro, força muscular dos membros superiores, dor pós-operatória e qualidade de vida, de mulheres com câncer de mama submetidas à reconstrução mamária.
- Investigar a segurança das intervenções fisioterapêuticas em mulheres com câncer de mama submetidas à reconstrução mamária.
- Investigar o intervalo entre a cirurgia e o início das intervenções fisioterapêuticas em mulheres com câncer de mama submetidas à reconstrução mamária.

3. METODOLOGIA

3.1 Desenho do estudo

Foi realizada uma revisão sistemática da literatura, seguida de metanálise, desenvolvidas no Programa de Pós-graduação em Tocoginecologia da Universidade Estadual de Campinas (UNICAMP), em parceria com a *Manchester Metropolitan University* (Reino Unido). O estudo foi registrado no *International prospective register of systematic review* (PROSPERO) (CRD42020192762) e seguiu as recomendações determinados pelo *Preferred Reporting Items for Systematic Reviews and Meta-Analysis* (PRISMA). O registro no PROSPERO encontra-se no Anexo 1.

3.2 Estratégia de busca

As estratégias de busca foram estruturadas usando palavras-chave e termos indexados em bases médicas (MeSH terms). Os termos utilizados estavam relacionados ou descreviam a reabilitação após reconstrução mamária em mulheres com câncer de mama. Para melhor empregabilidade das estratégias, foram utilizados artigos sentinela que abordassem o tema central e estes deveriam ser identificados nas buscas. Dessa forma realizou-se um pré-teste para melhor definição e direcionamento das buscas.

Após serem desenvolvidas, as estratégias foram adaptadas e aplicadas às principais bases de dados eletrônicas biomédicas e de saúde: PubMed, PubMed PMC, BVS/BIREME, EBSCOhost, Scopus, Web of Science, Embase, Cochrane Library, PEDro, Clinical Trials, ProQuest e BDTD. As fontes de relatos de literatura

cinzenta também foram pesquisadas (http://www.greylit.org/; http://www.opengrey.eu/). As estratégias foram aplicadas aos bancos de dados de registro de ensaios para identificar ensaios clínicos em andamento (clinical trial registry database: http://www.clinicaltrials. gov/) e as listas de referências dos estudos primários em potencial foram rastreadas e verificadas.

Não houve restrições para data de publicação ou idioma.

A descrição das estratégias e as adaptações realizadas para a busca em cada uma das bases de dados pode ser verificada no Apêndice 1.

3.3 Busca nas bases de dados

A busca nas bases de dados foi realizada eletronicamente com auxílio de bibliotecária com experiência em bases da área da saúde (A.P.M.O.). Em reunião online, foram feitas as adaptações necessárias às estratégias e, posteriormente, as bases foram acessadas para a busca. Os artigos identificados em cada base foram baixados em um arquivo único (formato ris ou txt) para serem analisados.

3.4 Critérios de seleção

Os estudos identificados a partir da estratégia de busca deveriam responder à seguinte questão: ‘as intervenções fisioterapêuticas impactam na funcionalidade e outros desfechos associados após a reconstrução mamária em mulheres com câncer de mama?’.

3.4.1 Desenhos de estudo incluídos

Foram selecionados ensaios clínicos randomizados (ECR), quase randomizados (quase-ECR) e ensaios clínicos controlados (ECC). Em uma busca preliminar de potenciais estudos para esta revisão, identificamos que o número de

ensaios clínicos era limitado, portanto, estudos observacionais também foram incluídos em nossa seleção (pesquisas de coorte, caso-controle e transversais).

3.4.2 Participantes

Os estudos deveriam incluir mulheres submetidas à reconstrução mamária imediata ou tardia, utilizando qualquer técnica após mastectomia, tendo idade igual ou superior a 18 anos. Estudos com técnicas de reconstruções mamárias associadas à oncoplástica também foram incluídos. Foram excluídos estudos com mulheres que realizaram a mastectomia sem reconstrução mamária, cirurgia conservadora, ou estudos de populações mistas, com e sem reconstrução.

3.4.3 Intervenções

As intervenções elegíveis envolveram qualquer técnica fisioterapêutico ou exercícios, com ou sem supervisão de um fisioterapeuta. Poderiam ser realizadas no pré ou pós-operatório, podendo abranger o uso de exercícios com amplitude de movimento passiva, ativa-assistida ou ativa; exercícios de fortalecimento; alongamentos; uso de técnicas de terapia manual, como massagem, drenagem linfática manual, liberação miofascial e outras técnicas relacionadas.

3.4.4 Comparações

Os estudos incluídos deveriam comparar fisioterapia e/ou exercícios aos cuidados/controle usuais, diferentes tipos de exercícios, nenhum exercício, outras técnicas de fisioterapia ou se observaram os efeitos da fisioterapia e/ou exercício na população especificada.

3.5 Seleção dos estudos

Após a busca nas bases de dados, os estudos selecionados foram inseridos no software Rayyan e EndNote para exclusão das duplicidades. Em seguida, os estudos foram analisados através do título e resumo no software Rayyan, por dois pesquisadores independentes, e foram selecionados de acordo com os critérios de seleção. Os estudos elegíveis eram acessados na íntegra para identificação dos outros critérios. Com base nas informações fornecidas no texto completo, os revisores determinarão sua elegibilidade. Os desacordos foram resolvidos por consenso ou consultando um terceiro revisor em todas as fases da seleção. Os motivos de exclusão dos estudos foram registrados.

3.6 Desfechos

A partir dos objetivos inicialmente descritos, foram traçados os desfechos primários e secundários deste estudo para delineamento dos dados a serem extraídos.

3.6.1 Desfechos primários

Como desfecho primário analisamos a funcionalidade dos membros superiores, sendo que esta poderia ser mensurada a partir da força muscular dos membros superiores, amplitude de movimento do ombro e/ou questionários específicos.

3.6.2 Desfechos secundários

Os desfechos secundários incluíram dor, qualidade de vida, eventos adversos (seroma, cicatrização e drenagem de feridas, extrusão de prótese,

infecção, deiscência cicatricial), adesão à intervenção, intervalo entre a cirurgia e o início das intervenções, e tempo de retorno ao trabalho.

3.7 Extração de dados

A extração de dados foi realizada de forma independente por dois autores usando um formato pré-definido. A ferramenta online Covidence (https://www.covidence.org/home) foi utilizada para gerenciar e comparar os dados extraídos pelos revisores. Semelhante ao processo de seleção, quaisquer divergências sobre os dados extraídos foram resolvidas por discussão ou por um terceiro revisor. As seguintes informações foram extraídas:

1. Características do estudo: autor, ano de publicação, país, fontes de financiamento;

2. Método: desenho do estudo, tamanho da amostra, população (idade, tipo de reconstrução e momento da cirurgia);

3. Avaliação crítica usando ferramentas para risco de viés (método apropriado de randomização, se aplicável, ocultação de alocação, descrição dos resultados);

4. Intervenção e Comparador: tipo de exercício, frequência, intensidade, tempo, tipo de controle/cuidados habituais, outras modalidades de fisioterapia (ex: massagem ou drenagem linfática) associada ou não ao exercício, adesão/adesão, co-intervenções;

5. Resultados: questionários utilizados, como a amplitude de movimento e força muscular foram medidas, tipo de eventos adversos, tempo de seguimento;

6. Intervalo no início da fisioterapia.

3.8 Risco de viés

A qualidade dos ECRs primários foi avaliada independentemente por dois revisores usando a ferramenta Cochrane de risco de viés ROB 2. Para os ECRs, quase-ECRs e ECCs, os domínios de risco de viés considerados foram geração de sequência aleatória, ocultação de alocação, ocultação de participantes, ocultação de pessoal, ocultação de avaliação de resultados, dados de resultados incompletos e relatórios seletivos de resultados. Cada domínio foi classificado como risco baixo, alto ou incerto de acordo com as informações fornecidas nos estudos.

3.9 Síntese dos dados

Estatísticas descritivas foram utilizadas para resumir as variáveis extraídas na revisão. Os estudos incluídos foram revisados pela equipe para determinar se os foram suficientemente homogêneos para serem combinados em uma meta-análise formal. Sendo assim, foi realizada a meta-análise e síntese narrativa. Para a meta-análise, os dados contínuos foram analisados como diferença média, com intervalos de confiança de 95%.

Os dados agrupados foram analisados usando estimativas de efeito aleatório com intervalos de confiança de 95% e a estatística I^2 foi usada para medir a heterogeneidade.

3.10 Análise de subgrupos

A análise de subgrupos foi realizada em relação aos métodos de reabilitação utilizados e para cada desfecho avaliado.

4. RESULTADOS

Breast reconstruction has no detrimental effects on the functional recovery of breast cancer patients undergoing early-start rehabilitation programs: a systematic review and meta-analysis

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Introduction: Breast reconstruction (BR) is known to improve body image and self-esteem in women who underwent surgery for breast cancer. Rehabilitation in BR patients can be suboptimal due to concerns about the safety of performing physical therapy procedures in this subset of patients. In addition, there are doubts regarding the timing of rehabilitation start in BR patients due to fear of increased risk of scar and pain complications. **Objective:** to review the current literature on physical therapy interventions aimed at preventing physical and functional disorders in breast cancer patients who undergo BR. **Methods:** Systematic review and meta-analysis registered under Prospero: CRD42020192762. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement recommendations were followed throughout this study. **Search strategy:** PubMed, PubMed PMC, BVS/BIREME, EBSCOhost, Scopus, Web of Science, Embase, Cochrane Library, PEDro, Clinical Trials, ProQuest, BDTD and gray literature, published until 2021. **Selection criteria:**

randomized or quasi-randomised clinical trials, controlled clinical trials and observational studies that used physical therapy techniques, with or without supervision, active or active-assisted exercises, stretching, manual therapy techniques. **Data extraction:** Data obtained from questionnaires on quality of life and functionality, pain, range of motion and muscle strength of the upper limbs, adverse effects and follow-up time were collected. **Results:** 1191 studies were identified and 5 were selected for qualitative analysis, with a total of 372 participants. Physical therapy interventions were abdominal exercises, active upper limb exercises, massage and meditation. The start of physical therapy ranged from 3 months before surgery to 15 or 30 days after. The meta-analysis of intervention studies revealed that early start of active exercises for upper limbs in the postoperative period of BR is better than the late start for upper limb flexion and abduction. In addition, it does not offer a greater risk of scar complications and pain. **Conclusions:** Our results suggest that starting exercise protocols as early as 15 days postoperatively may be not only safe but beneficial compared to later start for women who undergo BR.

Keywords: breast cancer; breast reconstruction; physical therapy modalities.

INTRODUCTION

Breast cancer is the most prevalent cancer in women worldwide, with an estimated 287,850 new cases in the USA in 2022, and in excess of 2 million cases worldwide in 2020[1,2]. Treatment for breast cancer includes surgical interventions to the breast and axilla that may precede or succeed systemic therapy[3–5]. Restriction to shoulder range of motion (ROM), impaired quality of life, and detrimental effects to psychological and emotional wellbeing (associated with body image issues and impaired sexual function) are commonly reported by breast cancer survivors. It has been shown that reduced self-esteem and other body image issues may also be detrimental to the recovery of breast cancer survivors[6,7]. These ailments range in severity depending on surgical extension and patients' phenotypical and clinical characteristics[3,8].

Studies suggest that breast reconstruction (BR) is an important intervention to counter the detrimental effects of breast surgery to body image and self-esteem[9–11]. The consensus surrounding the positive effects of BR is such that the procedure is enforced by law in several countries[12–17]. The Women's Health and Cancer Rights Act (WHCRA) requires that most group insurance plans cover BR for patients who undergo mastectomy[14,17].

BR can be performed immediately after mastectomy (immediate breast reconstruction) or even several years after the procedure (delayed breast reconstruction)[9]. In both cases, post-operative rehabilitation through physical therapy plays an important role in the promotion of quality of life for breast cancer survivors. In patients who underwent mastectomy, physical therapy has been shown to help restore shoulder ROM, reduce pain, improve physical perception, control anxiety and foster emotional and social function recovery[11,18–25]. Physical therapy modalities such as manual therapy, stretching, muscle strengthening, myofascial release, tissue mobilization, manual lymphatic drainage, and exercises are commonly used in patients who underwent surgical interventions to the breast

and axilla [18–25]. However, there are still many uncertainties related to physical therapy in patients undergoing BR, since the majority of the studies that demonstrate the benefits of physical therapy in patients treated surgically for breast cancer were based on cohorts with limited (or absent) subsets of patients who also underwent BR [26–30]. As a consequence, current rehabilitation recommendations for BR patients are based on expert opinion and clinical experience[31]. Importantly, there are unresolved concerns regarding the timing and selection of physical therapy modalities most appropriate for BR patients, resulting in lack of standardization of postoperative care for this ever-increasing subset of women[31].

We are concerned that missing standards may lead to suboptimal treatment options for BR patients. Therefore, in this systematic review and meta-analysis, we covered the current literature on physical therapy interventions aimed at preventing physical and functional disorders in breast cancer patients who underwent BR. Our hope is that the results of the present study may be useful for the development of postoperative care recommendations for patients who have undergone BR.

METHODS

This systematic review and meta-analysis were performed following the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (*PRISMA) Statement* recommendations. This study was registered in the *International prospective register of systematic review (PROSPERO)* database (CRD42020192762).

Search strategy

The search strategy was structured by researchers with clinical experience in the area, using the descriptors "Exercise Therapy" OR "Rehabilitation" OR "Physical Therapy

Modalities" AND "Breasts Neoplasms" AND "Mammaplasty", and adapted according to each database. Detailed search strategy is available in the Supplementary material. Different strategies were tested using sentinel articles to define the final strategy. We searched PubMed, PubMed PMC, BVS/BIREME, EBSCOhost, Scopus, Web of Science, Embase, Cochrane Library, PEDro, Clinical Trials, ProQuest, BDTD, gray literature (http://www.greylit.org/; http://www.opengrey.eu/), clinical trial registry database to identify ongoing clinical trials (http://www.clinicaltrials. gov/) and the reference lists of potential primary studies were checked. No date and language restrictions were applied to searches. The search results were exported to EndNote and Rayyan softwares to remove duplicates.

Selection Criteria

Randomized controlled trials (RCTs) or quasi-randomised trials (quasi-RCTs) and controlled clinical trials (CCTs) were included. A preliminary search detected a small number of RCTs; therefore, observational studies were also included. The inclusion criteria for the population were: only female subjects, aged 18 years old or older, who underwent BR (no restrictions to technique or timing of BR were applied). Exclusion criteria were: studies on animals, other publication types, non-accessible publications, or studies published in languages that could not be understood and properly translated by members of the study team. Interventions should have made use of physical therapy techniques, with or without supervision, and might therefore have included exercises with active or active-assisted range of motion; strengthening exercises; manual therapy techniques. Control should have been done with different techniques, exercises or no intervention. The primary outcome assessed was shoulder function, obtained through shoulder ROM, upper limb muscle strength and specific questionnaires. Secondary outcomes were pain, quality of life, complications such as seroma, infection, tissue necrosis, scar dehiscence, scar adhesion or related to the prosthesis,

prosthesis displacement, adherence to the rehabilitation interventions, time to return to activities, and interval between surgery and the onset of physical therapy.

Screening

We used the Rayyan QCRI software (Rayyan Systems Inc.)[32] to screen articles for eligibility. Titles and abstracts were screened independently by two independent reviewers (B.V.S. and B.F.M.); the reasons for exclusion were recorded and articles that were relevant or that further information was needed to make a decision were retrieved. Disagreements were resolved by consensus or consultation with a third reviewer (M.M.O.S.).

Data extraction

Data extraction was performed independently and pre-defined by two authors (B.V.S. and N.C.C.). The online tool Covidence (https://www.covidence.org/home)[33] was used to manage and compare the data extracted. Disagreements were resolved in discussions with a third reviewer (M.M.O.S.). The data extracted included study design, author names, year of publication, country, sample characteristics including type of reconstruction, sample size, information on risk of bias appraisal, intervention details (type of exercise, frequency, intensity and timing), control group treatment details, adherence to treatment, concomitant interventions, adverse events, tools for outcome assessment, results of the outcomes of interest and timing of the follow-up assessment.

Quality assessment

The quality of RCTs, quasi-RCTs and CCts was assessed by two independent reviewers using the Cochrane ROB 2 risk of bias tool[34], for the following domains: randomization process, deviation from intended interventions, missing outcome data, measurement of outcomes and selection of reported results. Each domain was defined as of low, high or uncertain risk according to the information provided. The overall bias was classified as of low, high or uncertain risk of bias. In addition, we used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) to rate the quality of scientific evidence in this systematic review.

Meta Analysis

Meta analyses were generated only for a select subset of studies and interventions covered in this systematic review. Reasons for the restriction of studies available for meta-analyses are provided in the results section. In summary, data for the meta-analytical procedures were retrieved from Rizzi et al. 2020 and Rizzi et al. 2021, who presented tabulated data on the outcomes of interest (Range of Motion - ROM - components). For Kim et al. 2019, we derived ROM estimates from the graphical depictions of ROM variations during the study. Conversion of graphical data to numerical outputs was performed using the Boxy SVG Vector Graphics tools[35] (please refer to *Suitability of studies' data for meta-analysis* section for details). The analysis was made comparing the data from the first post-operatory evaluation with that collected 2 months after surgery. Next, we produced the forest plots for the outcome of interest, using the random effects model in order to obtain the grouped effect measures (mean differences of ROM components), with 95% confidence intervals. In order to determine the difference between the standard deviations for each of the outcomes, we used the following relation,

$$sd.difference = \sqrt{(sd.init^2 - sd.final^2)}$$

where *sd.init* stands for the standard deviation of the ROM measurements before the intervention and *sd.final* for the same parameter, but after intervention. All calculations were performed using the R Environment for Statistical Computing[36], and RevMan version 5.4[37].

RESULTS

A total of 1191 studies were identified by searching databases and other sources. After duplicate exclusion, 788 articles were screened for eligibility. Nine papers were selected and the full text retrieved. After that, another four papers were excluded, for the following reasons: inclusion of women who had not undergone BR, inclusion of women who underwent prophylactic mastectomy, study published in French (could not be translated), and use of usual care only as an intervention. Therefore, five articles were selected for quantitative and qualitative analysis. **Figure 1** is a flowchart detailing study selection.

The characteristics of interest of the selected studies are described in **Table 1**. Four of the selected studies were clinical trials and one was a case-control study. Sample size ranged from 40 to 115 participants, totalling 372 patients. BR was performed using either autologous (abdominal flap[28,38]) or heterologous (silicone prosthesis or expander [29,39]) tissue. Only one study[40] included women who underwent breast-conserving surgery associated with BR, this later performed using oncoplastic technique.

Quality appraisal

Intervention protocols

Table 2 describes the objectives and interventions of the selected studies. Three studies[29,39,40] compared the effect of free active exercises for the upper limbs *versus* active exercises with range of motion restricted to 90 degrees, in the postoperative period. One study[28] investigated post-surgery stress relief using massage combined with meditation *versus* massage alone. Finally, one study[38] evaluated the effect of preoperative abdominal exercises on complications after breast reconstruction.

Futter et al. (2003) compared exercises for abdominal strengthening in the preoperative period of delayed BR with a perforating flap of the epigastric artery. According to that study's protocol, 10 repetitions of each exercise were performed daily, and patients were encouraged to increase the repetitions whenever possible; the intervention was planned to last for at least 6 weeks. Assessments were made 1 week before surgery and 1 year after, and the intervention group was also assessed 3 months before surgery. Dion et al. (2016) evaluated the use of massage associated or not to guided meditation in women who underwent delayed or immediate breast reconstruction with an abdominal flap. The interventions were carried out during the first 3 days after surgery, while patients were still in hospital, and the intervention group was instructed to maintain the practice of meditation after discharge. Assessments were performed daily, before and after the intervention, and 3 weeks after the intervention.

Kim et al. (2019) compared the performance of a self-exercise program in the early and late postoperative period of immediate BR in patients using an expansion prosthesis. The intervention group was instructed to limit the movement of the upper limbs to shoulder height for 2 weeks and subsequently started a free active exercise program. For the control group, patients were instructed to immobilize the upper limbs for up to 4 weeks, before

starting the exercise program. Data from this group were collected retrospectively. Assessments were made 1 week, 1 and 2 months after surgery for both groups.

Rizzi et al. carried out two similar studies in different populations. The first (Rizzi et al., 2020) compared the performance of upper limb exercises limited to 90º within 15 and 30 days after immediate BR with a prosthesis or expander. After that period, the participants were instructed to resume their daily activities and perform the exercises with free ROM. The evaluations were made preoperatively, and 7, 15, 30, 60 and 90 days after the operation, for both groups. The second (Rizzi et al., 2021) study was based on the same protocol as that described in their 2020 study; however, the participants of Rizzi et al. (2021) study underwent BR with oncoplastic technique, encompassing conservative surgery and contralateral symmetrisation.

Outcomes

Table 3 summarizes the outcomes examined by each study.

Function

Three studies[29,39,40] evaluated arm function using the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire[41]. Kim et al. (2019) detected no statistically significant difference in arm function between women who underwent free active *versus* those undergoing ROM restricted exercises. Similar findings were reported by Rizzi et al (2021). However, Rizzi et al. (2020), studying women who underwent immediate BR associated with mastectomy, detected a significant difference of 12.96 points ($p < 0.05$) in function favoring the group that started free active exercises 15 days postoperatively, compared to women who started free exercises 30 days after surgery.

Shoulder range of motion

Shoulder range of motion (ROM) was assessed with a goniometer[42] in 3 studies[29,39,40]. Kim et al. (2019) reported that, one month after surgery, flexion and abduction ROM were greater in the group that started free active exercises 15 days after surgery compared to the group that awaited 30 days to resume physical therapy ($p<0.001$ for both flexion and abduction ROM). This trend persisted up to at least the 2nd month postoperatively for abduction ROM ($p = 0.017$). Rizzi et al. (2020) reported similar results for shoulder abduction ($p = 0.033$), flexion ($p = 0.05$) and external rotation ($p = 0.011$). However, in the study by Rizzi et al. published one year later (2021), women who had undergone breast reconstruction associated with breast-conserving surgery had similar ROM recovery regardless of whether they started physical therapy 15 or 30 days after surgery. The certainty of effects regarding the four ROM axes is presented in Table 4 (GRADE), and varies from very low to high.

Muscle strength

Only Futter et al. (2003) evaluated muscle strength. Those authors measured only abdominal muscle strength in women who underwent *deep inferior epigastric perforator* (DIEP) reconstruction. No data regarding the upper limbs was reported.

Pain

Four studies[28,29,39,40] assessed pain. In the study by Dion et al. (2016) and in the studies by Rizzi et al. (2020, 2021), the visual analogue scale was used for measuring pain. Kim et al. (2019) used a numerical scale from 0 to 10 for measurement. Dion et al. reported pain relief after the application of massage alone and associated with guided meditation ($p < 0.05$), but with no significant difference between the study groups. Kim et al. did not observe

improvement in pain, nor were there any statistically significant differences in pain measurements between groups during the entire follow-up period. Rizzi et al. (2021) also did not observe differences in pain measurements between groups during follow-up. However, in the group that started exercises 30 days after surgery (compared to that that started 15 days earlier), an increase in pain levels was seen on the 30th postoperative day, compared to the preoperative evaluation. Rizzi et al (2020), reporting on women who underwent breast reconstruction associated with mastectomy, demonstrated that, at the 60th postoperative day, the group that started exercises later had a higher level of pain (increase of 2.82 points on the pain scale). In addition, in that group, a higher proportion of women had enduring pain throughout follow-up. It is worth noting that pain intensity was measured only in women who reported experiencing pain (i.e., pain scores for the study groups may be biased in that, for patients with no pain, a score = 0 should have been attributed to compound the average score).

Quality of life

The studies by Futter et al. (2003) and Kim et al. (2019) assessed quality of life (QOL) using the *Short Form 36 Health Survey (SF-36)*[43]; in both studies, no significant QOL measurement differences were detected between the study groups during follow-up.

Scar complications

Kim et al. (2019) observed that only one participant in the early exercise group had oozing in the surgical site during the 1st postoperative week, and this symptom was still noticeable for up to 2 months after surgery. For both groups, there were no other identifiable scarring complications during follow-up. In the study by Rizzi et al. (2020) there was no significant difference between groups regarding the prevalence of scar dehiscence, seroma, infection and tissue necrosis. However, most complications occurred before randomization,

since patients were randomized 15 days after surgery. Finally, the study by Rizzi et al. (2021) showed a higher prevalence (56.7%) of scar dehiscence in the control group compared to that in the intervention group.

Adverse events

Of all included studies, only one[29] examined adverse events as related to the intervention. Kim et al. (2019) observed that, at the 1-month evaluation, four participants had adhesive capsulitis in the control group and none in the intervention group, and three of the patients who had capsulitis improved after starting physical therapy. In that same study, one participant in the intervention group had complications at the surgical site, but these originated before the beginning of the exercise protocol.

Time between surgery and start of intervention

Table 2 depicts the time intervals between the BR procedure and the start of the intervention for each of the included studies. Futter et al. (2003) started abdominal exercises 3 months *before* surgery, and exercise protocols were maintained for 6 consecutive weeks. Dion et al. (2016), started study interventions within 3 days after surgery, while patients were still hospitalized. Kim et al. (2019) gave study participants a recommendation to avoid arm movements above the shoulder line during the first 2 weeks after surgery. Patients in the intervention group were instructed to start the active exercises protocol on the first day of the 3rd week after surgery; for the control group, arm movement restrictions should have been kept until the end of the 4th week after surgery. Finally, Rizzi et al. (2020 and 2021) started arm mobilization on the day following surgery, although restricting ROM to 90º during the first 15 days. After that 15-day period, the intervention group started the active exercises

protocol, whereas the control group had to wait until 30 days after surgery to start active exercises.

Other outcomes

No studies reported on adherence to treatment plan and time to return to daily activities.

Risk of bias

The Revised Cochrane risk-of-bias[34] data is presented in **Figure 2**. The studies by Rizzi et al., 2020 and Rizzi et al., 2021 featured a low risk of bias for all domains, regardless of the outcome being examined. The study by Kim et al. (2019), in which functionality (DASH), ROM, pain, and quality of life were studied, presented a high risk-of-bias related to the randomization process, missing outcome data (with the exception of their data on ROM) and measurement of the outcomes. The same risk-of-bias profile was shared by Futter et al. (2003), who studied abdominal muscular strength and Quality of Life. The study by Dion et al. (2016) on pain had some risk-of-bias concerns related to the randomization process and high risk-of-bias concerning the measurement of the outcome (pain).

Suitability of study data for meta-analysis

One of our major goals was to produce meta-analyses of the available studies regarding the main outcomes related to physical therapy intervention modalities: shoulder ROM, pain, upper limb functionality, and quality of life (preferably partitioned into several specific domains). Useful data on ROM was retrievable from two studies, both from the same authors (Rizzi 2020 and Rizzi 2021). Kim et al. (2019) also evaluated ROM; however, for this

study, ROM measurements were not available in tables, which forced us to derive estimates for each axis of movement (flexion, abduction, internal and external rotation) from the figures available. The Boxy SVG Vector Graphics tools[35] were used for that purpose (Note: we tried to contact the authors via email in order to obtain the direct ROM measurements, but received no response from them). Standard deviations were calculated by subtracting the mean ROM from its maximum confidence interval value and dividing the result by 1.96 (assuming p=0.05 as significant, as stated in the statistics section of the studies). For the "functionality" outcome, we obtained useful information from Rizzi et. al. studies, since the other authors who also examined this outcome (Dion et. al., 2015) provided no estimates of the mean difference between study groups. We also tried to derive data for the outcome "pain", but useful data for meta-analyses were available only from Rizzi's papers (Rizzi, 2020 and Rizzi, 2021). Therefore, we decided to restrict our meta-analyses to shoulder ROM, thereby including the two studies from Rizzi et al. (2020, 2021) and one from Kim et al. (2019). It is worth noting that the studies by Rizzi and cols. reported on two distinct cohorts of patients (Rizzi et al., 2020 and Rizzi et al., 2021), which validates their inclusion in this meta-analysis as two separate studies.

Meta-analysis

Due to the methodological constraints listed above, we restricted our meta-analyses to Kim et al., 2019, Rizzi et al., 2020, and Rizzi et al., 2021. In addition, meta-analysis was also limited to four different components of shoulder ROM: abduction, flexion, external and internal rotation. Individual forest plots for each of these components were produced and can be viewed in **Figure 3, 4, 5** and **6**. According to the meta-analyses of these three studies, significant improvements of flexion (mean difference between groups =

6.26 degrees; 95%CI 2.92 to 9.61) and abduction (mean difference between groups = 11.01 degrees; 95%CI 4.01 to 17.96) were detected favoring women who started exercises 15 days after surgery, contrasted to those who started 30 days after surgery. On the other hand, shoulder internal and external rotation were not statistically dissimilar between groups.

DISCUSSION

The results of this systematic review and meta-analysis suggest that the previously poorly studied subset of breast cancer women who undergo BR may enjoy benefits from free upper limb exercise protocols, with tangible upper limb ROM improvements, increased patient QOL and reduced pain. These benefits are comparable to those previously reported for breast cancer patients who did not undergo BR [18,20,24,25,44]. Our results also suggest that starting the exercise protocols 15 days postoperatively may be advantageous contrasted to starting only 30 after surgery, especially regarding shoulder flexion/abduction (as our pooled analyses of available studies suggest) and pain reduction. In addition, one of the studies[28] included in this review also suggested that manual therapy and meditation may have a positive effect on pain management in the immediate postoperative period following breast surgery.

Of the five studies included in this review, four were clinical trials[28,38–40] and one was a case-control study [29]. However, we detected a high risk-of-bias for 3[28,29,38] out of the 5 studies, which was a major source of concern for us. We emphasize to the reader that data quality is probably suboptimal for some of the included studies. In order to counteract this lack of study quality, we opted to particularize our analyses according to the outcomes being examined by the studies, since some outcomes were adequately examined in a given study while others were not. For instance, in Kim et al. (2019), the risk-of-bias for functionality was worse than that for the same authors' evaluation of shoulder ROM.

One of the most clinically relevant findings of our meta-analysis was that starting free exercises protocol 15 days after surgery may result in significantly better shoulder flexion and abduction capacity compared to waiting 30 days to start performing exercises. These improved results may stem from less adherence consolidation in this early postoperative period, and to lower levels of pain in this group of women[39,40]. However, the other axes of shoulder ROM (internal/external rotation) were seemingly not responsive to an early start of

the exercise protocols. Starting physical therapy interventions earlier was not associated with increased incidence of surgical scar complications, nor adhesive capsulitis[29,39,40]. These findings may render obsolete the usual recommendation of limiting upper limb exercises to 90 degrees in the early (15 days) postoperative period for patients undergoing BR[26,45,46]. Our study group reached similar conclusions when we studied operated breast cancer patients, who did not undergo BR[47].

It is important to highlight a few methodological details that differ across studies. First, the type of BR varied across studies. The extent to which arm functionality may be affected probably depends on the anatomical modifications caused by the surgical procedures. Rizzi et al. 2020 and Kim et al. 2019 evaluated patients that underwent implant-based BR, whereas Rizzi et al. (2021) studied women who underwent BR with oncoplastic techniques; Rizzi et al. (2021) showed that women undergoing BR with oncoplastic technique evolved with similar shoulder ROM regardless of the time of initiation of free exercises. This particular finding was possibly a consequence of the more conservative surgical approach.

Shoulder ROM was the outcome of interest in 3 studies[29,39,40]: Kim et al. (2019) observed improvement in shoulder abduction and flexion ROM in the 1st month after surgery by the group that started the exercises early; similar trends were observed in the 2nd month postoperatively concerning shoulder abduction. In addition to the improvement in abduction capacity, Rizzi et al. (2020) also detected better shoulder flexion and external rotation in women who started free exercises early. The better results observed in Rizzi et al. (2020) can be explained by the use of functional exercises that involve the mobility of the entire shoulder complex. In contrast, Kim et al performed exercises specifically aimed for each axis of movement, focusing on the frontal and sagittal planes.

Among the secondary outcomes proposed in the search strategy, no studies were found that evaluated shoulder muscle strength. Futter et al. (2003) evaluated abdominal

muscle strength in women who underwent DIEP with an epigastric artery perforator flap, but this study was considered to bear a high risk-of -bias due to the randomization process and lack of data on the evaluated outcome. The muscle strength of the upper limbs is a relevant measure for assessing upper limb functionality. A 2020 study[31] points out that muscle strengthening exercises can be prescribed 1 to 3 months postoperatively.

Pain was assessed in 4 of the analyzed studies[28,29,39,40]. Despite the high risk-of-bias concerning this outcome in the evaluated studies, Dion et al. (2016) observed a similar reduction in pain after the application of massage alone *versus* massage associated with meditation. Manual therapy can be a valuable tool for pain relief, especially in the first postoperative days[23,28]. In the study by Kim et al. (2019) there was no difference in pain scores for the group that started exercises 15 days after surgery compared to those that started 30 after surgery. Rizzi et al. (2021) observed higher pain scores for women who underwent BR with oncoplastic technique and started exercises on the 30th postoperative day compared to women who started exercises 15 days after surgery. Rizzi et al. (2020) also noted that women who started the exercises 30 days after BR, had higher levels of pain on the 60th postoperative day. These results suggest that early start of postoperative exercises may be associated with reduced pain. Or, at least, that the early start of upper limb exercises favors recovery without causing increased levels of pain in the postoperative period of BR.

Quality of life (QOL) was assessed only by Futter et al. (2003) and much later by Kim et al. (2019). Both studies showed no significant differences in QOL scores as related to either abdominal exercises vs. no exercises (Futter et al, 2003) or late vs. early onset of exercise protocols (Kim et al, 2019). It is worth remembering that, according to the RoB2 tool, the studies by Futter et al. (2003) and Kim et al. (2019) had a high risk-of-bias concerning QOL outcomes.

The dearth of studies examining the benefits of physical therapy interventions in women undergoing BR, especially in the early postoperative period, may stem from practitioners' and researchers' worries about the suitability of starting physical interventions in women who underwent extensive surgical procedures. These interventions often affect anatomical structures such as the pectoral and *latissimus dorsi* muscles. Fortunately, for the first time in the medical literature, we were able to amalgamate data from the few methodologically sound studies on the subject and conclude that such early interventions are not only safe but effective as well. We therefore believe that this systematic review and meta-analysis may contribute to the clinical practice, mainly assuaging concerns related to physiotherapy interventions in the early postoperative period of women who undergo BR. On the other hand, we acknowledge that finding methodologically robust studies on such interventions has been challenging, and our systematic review encompasses a heterogeneous group of outcomes and interventions. Also of note, we were unable to retrieve data concerning patients adherence to the prescribed treatments, and on how those patients fared when the reported interventions ceased.

CONCLUSIONS

This systematic review and meta-analysis suggest that exercises aimed at improving arm functionality in women who underwent BR are can be safely started as early as 15 days after surgery. In addition to the benefits directly associated with upper limb range of motion, early start of such exercises seem not to be associated with increased complications such as scar dehiscence or pain. However, our review of the literature also revealed that currently available studies, with reliable analyses, are restricted to interventions based on exercises, leaving other interventions such as manual therapy and musculoskeletal manipulations largely unexplored. Therefore, the obvious next step for us is to design and

perform a randomized trial to evaluate these mostly unexplored physical therapy intervention modalities in patients who underwent BR. This study protocol is now being finalized and results can be expected for the next few years.

REFERENCES

1. American Cancer Society (ACS). Cancer Stat Facts: Female Breast Cancer [Internet]. National Cancer Institute. 2019;Available from: https://seer.cancer.gov/statfacts/html/breast.html

2. Global Cancer Observatory, World Health Organization/International Agency for Research on Cancer. Breast cancer statistics [Internet]. World Cancer Research Fund International (WCRFI). 2022 [cited 2022 Sep 28];Available from: https://www.wcrf.org/cancer-trends/breast-cancer-statistics/

3. American Cancer Society (ACS). Surgery for breast cancer [Internet]. National Cancer Institute. 2021;Available from: https://www.cancer.org/cancer/breast-cancer/treatment/surgery-for-breast-cancer.html

4. Gnant M. Breast surgery after neoadjuvant therapy. Curr Opin Oncol. 2022;

5. World Health Organization (WHO). Breast cancer: prevention and control [Internet]. Available from: https://www.who.int/news-room/fact-sheets/detail/breast-cancer#:~:text=Reducing%20global%20breast%20cancer%20mortality,and%20comprehensive%20breast%20cancer%20management.

6. Zhang P, Li CZ, Wu CT, Jiao GM, Yan F, Zhu HC, et al. Comparison of immediate breast reconstruction after mastectomy and mastectomy alone for breast cancer: A meta-analysis. European Journal of Surgical Oncology. 2016;43:285–93.

7. Fang SY, Shu BC, Chang YJ. The effect of breast reconstruction surgery on body image among women after mastectomy: A meta-analysis. Breast Cancer Res Treat. 2013;

8. Instituto Nacional de Câncer (INCA). Câncer de Mama [Internet]. 2021;Available from: https://www.inca.gov.br/tipos-de-cancer/cancer-de-mama/profissional-de-saude

9. D'Souza N, Darmanin G, Fedorowicz Z. Immediate versus delayed reconstruction following surgery for breast cancer. Cochrane Database of Systematic Reviews. 2011;

10. Anbiyaiee A, Abouali M, Dari G, Anbiyaee O, Anbiyaiee A. Breast Reconstruction after Mastectomy in Women with Breast Cancer : A Systematic and Meta-Analysis Review. 2020;9:3–9.

11. Shiraishi M, Sowa Y, Tsuge I, Kodama T, Inafuku N, Morimoto N. Long-Term Patient Satisfaction and Quality of Life Following Breast Reconstruction Using the BREAST-Q: A Prospective Cohort Study. Front Oncol. 2022;12.

12. Ministério da Saúde, Secretaria de Atenção à Saúde, Secretaria de Ciência T e IE. Diretrizes Diagnósticas e Terapêuticas do Carcinoma de Mama - CONITEC. 2019;

13. Ministério da Saúde. Câncer de mama: sintomas, tratamentos, causas e prevenção [Internet]. gov.br. 2020;Available from: https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/c/cancer-de-mama#:~:text=Existem%20v%C3%A1rios%20 tipos%20de%20c%C3%A2ncia,dos%20 casos%20tem%20bom%20progn%C3%B3stico.&text=N%C3%BAmero%20de%20 mortes%3A%2018.295%2C%20 sendo,Mortalidade%20 por%20C%C3%A2ncia%20%2D%20).

14. Saliba GAM, Carvalho EES de, Filho AF da S, Alves JCRR, Tavares MV, Costa SM da, et al. Reconstrução mamária : análise de tendências e suas complicações maiores. Revista Brasileira de Cirurgia Plástica. 2013;28:619–26.

15. Fundação Oswaldo Cruz. Principais Questões sobre Reconstrução da Mama: direitos e desafios para acesso no SUS [Internet]. nstituto Nacional de Saúde da Mulher, da Criança e do Adolescente Fernandes Figueira. Portal de Boas Práticas em Saúde da Mulher, da Criança e do Adolescente. 2021;Available from: https://portaldeboaspraticas.iff.fiocruz.br/atencao-mulher/principais-questoes-sobre-reconstrucao-da-mama-direitos-e-desafios-para-acesso-no-sus/

16. Cutress R, Summerhayes C, Rainsbury R. Guidelines for oncoplastic breast reconstruction. The Annals of The Royal College of Surgeons of England. 2013;95:161–2.

17. American Cancer Society (ACS). Women's Health and Cancer Rights Act [Internet]. cancer.org. Available from: https://www.cancer.org/treatment/finding-and-paying-for-treatment/health-insurance-laws/womens-health-and-cancer-rights-act.html

18. McNeely ML, Campbell K, Ospina M, Rowe BH, Dabbs K, Klassen TP, et al. Exercise Interventions for Upper Limb Dysfunction Due to Breast Cancer Treatment. Cochrane Database of Systematic Reviews. 2010;

19. Lahart IM, Metsios GS, Nevill AM, Carmichael AR. Physical activity for women with breast cancer after adjuvant therapy. Cochrane Database of Systematic Reviews. 2018;

20. Groef A de, Kampen M van, Dieltjens E, Christiaens M, Neven P, Geraerts I, et al. Effectiveness of Postoperative Physical Therapy for Upper-Limb Impairments After Breast

Cancer Treatment: A Systematic Review. Arch Phys Med Rehabil [Internet]. 2015;96:1140–1053. Available from: http://dx.doi.org/10.1016/j.apmr.2015.01.006

21. Serra-añó P, Inglés M, Bou-catalá C, Iraola-lliso A, Espí-lópez GV. Effectiveness of myofascial release after breast cancer surgery in women undergoing conservative surgery and radiotherapy : a randomized controlled trial. Support Care Cancer. 2018;27:2633–41.

22. Groef A de, van Kampen M, Vervloesem N, Dieltjens E, Christiaens MR, Neven P, et al. Effect of myofascial techniques for treatment of persistent arm pain after breast cancer treatment: randomized controlled trial. Clin Rehabil. 2018;32:451–61.

23. do Amaral MTP, de Oliveira MMF, Ferreira NDO, Guimarães RV, Sarian LO, Gurgel MSC. Manual therapy associated with upper limb exercises vs. exercises alone for shoulder rehabilitation in postoperative breast cancer. Physiother Theory Pract. 2012;28:299–306.

24. Cho Y, Do J, Jung S, Kwon O, Jeon JY. Effects of a physical therapy program combined with manual lymphatic drainage on shoulder function , quality of life , lymphedema incidence , and pain in breast cancer patients with axillary web syndrome following axillary dissection. Support Care Cancer. 2015;24:2047–57.

25. Scaffidi M, Vulpiani MC, Vetrano M, Conforti F, Marchetti MR, Bonifacino A, et al. Early rehabilitation reduces the onset of complications in the upper limb following breast cancer surgery. Eur J Phys Rehabil Med. 2012;48:601–11.

26. Teixeira LFN, Sandrin F. The role of the physiotherapy in the plastic surgery patients after oncological breast surgery. Gland Surg. 2014;3:43–7.

27. Unukovych D, Johansson H, Johansson E, Arver B, Liljegren A, Brandberg Y. Physical therapy after prophylactic mastectomy with breast reconstruction : A prospective

randomized study. The Breast [Internet]. 2014;1–7. Available from: http://dx.doi.org/10.1016/j.breast.2014.01.010

28. Dion LJ, Engen DJ, Lemaine V, Lawson DK, Brock CG, Thomley BS, et al. Massage therapy alone and in combination with meditation for breast cancer patients undergoing autologous tissue reconstruction : A randomized pilot study. Complement Ther Clin Pract [Internet]. 2016;23:82–7. Available from: http://dx.doi.org/10.1016/j.ctcp.2015.04.005

29. Kim KH, Yeo SM, Cheong IY, Kim Y, Jeon BJ, Hwang JH. Early rehabilitation after total mastectomy and immediate reconstruction with tissue expander insertion in breast cancer patients: A retrospective case-control study. J Breast Cancer. 2019;22:472–83.

30. Oliveira RR de, Silva MPP e, Gurgel MaSC, Pastori-Filho L, Sarian LO. Immediate Breast Reconstruction With Transverse Latissimus Dorsi Flap Does Not Affect the Short-term Recovery of Shoulder Range of Motion After Mastectomy. Ann Plast Surg. 2010;64:402–308.

31. Mazuquin B, Sunemi MM de O, e Silva MPP, Sarian LOZ, Williamson E, Bruce J. Current physical therapy care of patients undergoing breast reconstruction for breast cancer: a survey of practice in the United Kingdom and Brazil. Braz J Phys Ther. 2021;25:175–85.

32. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan—a web and mobile app for systematic reviews. Syst Rev. 2016;5:210.

33. Veritas Health Innovation. Covidence systematic review software [Internet]. Available from: www.covidence.org

34. Sterne JAC, Savović J, Page MJ, Elbers RG, Blencowe NS, Boutron I, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. BMJ. 2019;l4898.

35. Jarosław Foksa. Boxy SVG - SCALABLE VECTOR GRAPHICS EDITOR [Internet]. 2012;Available from: https://boxy-svg.com/

36. R Core Team. R: A language and environment for statistical computing [Internet]. 2021;Available from: https://www.R-project.org/

37. Review Manager (RevMan) [Computer program]. The Cochrane Collaboration. Version 5.4, 2020.

38. Futter CM, Weiler-Mithoff E, Hagen S, van de Sijpe K, Coorevits PL, Litherland JC, et al. Do pre-operative abdominal exercises prevent post-operative donor site complications for women undergoing DIEP flap breast reconstruction? A two-centre, prospective randomised controlled trial. Br J Plast Surg. 2003;56:674–83.

39. Rizzi SKLA, Haddad CAS, Giron PS, Figueira PVG, Estevão A, Elias S, et al. Early Free Range-of-Motion Upper Limb Exercises After Mastectomy and Immediate Implant-Based Reconstruction Are Safe and Beneficial: A Randomized Trial. Ann Surg Oncol. 2020;

40. Rizzi SKLA, Haddad CAS, Giron PS, Figueira PVG, Estevão A, Elias S, et al. Exercise Protocol With Limited Shoulder Range of Motion for 15 or 30 Days After Conservative Surgery for Breast Cancer With Oncoplastic Technique. Am J Clin Oncol. 2021;44:283–90.

41. Leblanc M, Stineman M, Demichele A, Stricker C, Mao JJ. Validation of quick DASH outcome measure in breast cancer survivors for upper extremity disability. Arch Phys Med Rehabil [Internet]. 2014;95:493–8. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3624763/pdf/nihms412728.pdf

42. Marques AP. Manual de Goniometria. 3ª. Barueri - SP: 2014.

43. Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care. 1992;30:473–83.

44. Oliveira MMF de, Rezende LF, Amaral MTP do, Silva MPP e, Morais SS, Gurgel MSC. Manual lymphatic drainage versus exercise in the early postoperative period for breast cancer. Physiother Theory Pract. 2014;30:384–9.

45. McAnaw MB, Harris KW. The Role of Physical Therapy in the Rehabilitation of Patients with Mastectomy and Breast Reconstruction. Breast Dis. 2002;16:163–74.

46. Estevão A, Mendes AF, Silva ML da, Ventura PL, Biagi AC, Cunha MCB. Exercícios Imediatos versus Exercícios Tardios no Pós-Operatório de Cirurgias Oncomamárias: Limitação ou Liberação da Amplitude de Movimento? Revista Brasileira de Cancerologia. 2018;64:551–60.

47. Silva MPP e, Derchain SFM, Rezende L, Cabello C, Martinez EZ. Movimento do ombro após cirurgia por carcinoma invasor da mama: estudo randomizado prospectivo controlado de exercícios livres versus limitados a 90º no pós-operatório. Revista Brasileira de Ginecologia e Obstetrícia. 2004;26:125–30.

Table 1 - Main design features of the studies included in the systematic review and meta analysis

Trial	Design	Objectives	Nº randomized patients	Population	Intervention group (IG)	Comparison group (CG)	Results
Futter (2003) UK and Belgium	Prospective randomized controlled trial	Investigate the effect of pre-operative abdominal strengthening to preventing postoperative abdominal complications.	n = 93 Intervention (38) Control (55)	Women undergoing delayed breast reconstruction with a deep inferior epigastric perforator flap	Exercises using 'Abdotrim' Abdominal Exerciser	Usual care	-Muscle strength: there was a statistically significant increase in static (isometric) muscle strength and thickness pre-operatively for the IG. -Quality of Life: There was no significant difference in any SF-36 sub-scores between the IG and CG.
Dion (2016) USA	Randomized controlled pilot trial	To compare massage or massage + meditation is more beneficial for stress management.	n = 40 Intervention (20) Control (20)	Women who had undergone a mastectomy, and were scheduled to undergo abdominally based autologous tissue reconstruction	Massage + guided meditation	Massage only	-Pain: relief after the application of massage alone and associated with guided meditation ($p < 0.05$), but with no significant difference between the study groups
Kim (2019) Korea	Case-control Retrospective	Compare early rehabilitation exercise programs with shoulder immobilization on shoulder mobility, pain, quality of life, and postoperative complications.	n = 115 Intervention (49) Control (66)	Women who underwent immediate breast reconstruction surgery with tissue expander insertion	Self-exercise program after 2 weeks of surgery	Shoulder immobilization for 4 weeks (conventional protocol)	-Functionality: no significant difference -ROM: flexion and abduction ROM were higher in the IG ($p < 0.001$) -Pain: no significant difference -Quality of life: no significant difference -Scar complications: only one participant in the IG had oozing in the surgical site during the 1st postoperative week

Rizzi (2020) Brazil	Randomized Clinical Trial	Compare the effect of shoulder joint range limitation for 15 or 30 days on surgical complications, on shoulder ROM, pain, and upper limb function.	n = 62 Intervention (31) Control (31)	Women treated with mastectomy and immediate implant or tissue expander reconstruction	Exercises and ADL's at PO15 in free amplitude.	Exercises and ADL's at PO30 in free amplitude.	-Functionality: detected a significant difference of 12.96 points ($p < 0.05$) favoring the IG -ROM: higher shoulder abduction ($p = 0.033$), flexion ($p = 0.05$) and external rotation ($p = 0.011$) in the IG -Pain: demonstrated that at the 60th postoperative day, the CG had a higher level of pain (increase of 2.82 on the pain scale) -Scar complications: no significant difference
Rizzi (2021) Brazil	Randomized Clinical Trial	Compare the effect of limiting shoulder ROM for 15 or 30 days on surgical complications, ROM, pain and upper limb function.	n = 62 Intervention (31) Control (31)	Women undergoing conservative surgery with oncoplastic technique and contralateral symmetrization	Exercises and ADL's at PO15 in free amplitude.	Exercises and ADL's at PO30 in free amplitude.	-Functionality: no significant difference -ROM: similar ROM recovery in both groups -Pain: no significant difference -Scar complications: higher prevalence of scar dehiscence in the CG

Table 2 **-** Summary of the interventions evaluated by the studies included in the systematic review and meta analysis

Trial	Objective	Intervention group (IG)	Comparison group (CG)	Timepoints	Protocol
Futter (2003) UK and Belgium	To investigate the effect of preoperative abdominal strengthening in the prevention of postoperative abdominal complications in women undergoing breast reconstruction with a deep inferior epigastric perforator flap	Exercises using 'Abdotrim' Abdominal Exercises	Usual care	- Initial assessment: 3 months (IG) or 1 week (CG) prior surgery - Post-exercise assessment: 1 week prior surgery (IG) - Final assessment: 12 months post-operatively (IG and CG)	Time elapsed between surgery and start of intervention: 3 months before surgery Intervention: - Minimum 6 weeks of straight and oblique flexion exercises - 10 repetitions daily with increasing amount as possible - Exercise instruction sheet and log sheet Comparison: - Usual care (not described)
Dion (2016) USA	To explore whether massage combined with meditation is more beneficial than therapeutic massage alone in managing stress in women recovering from autologous tissue reconstruction following mastectomy for breast cancer	Massage + guided meditation	Massage only	- Assessments: postoperative days 1, 2 and 3 - Before and after interventions - PSS-14*: evaluation on postoperative day 1 before intervention and on day 3 after intervention	Time elapsed between surgery and start of intervention: 3 days after surgery Intervention: - 15 minutes viewing of a DVD about paced breathing - Gratitude meditation instructed by the massage therapist - 20 minutes individualized massage session - Therapist-instructed gratitude meditation in the middle of the 20 minutes - On day 3, patients were given a copy of the DVD and they were encouraged to continue practicing meditation after hospital dismissal Comparison: - Massage for 20 min on post operative days 1, 2, and 3 Individualized session to patient preference and expressed needs (location, techniques and pressure, positioning, music during massage, essential oils and dimmed lighting) Techniques: Swedish massage, acupressure and foot reflexology.

Kim (2019) Korea	To compare the early rehabilitation exercise program with the conventional protocol by evaluating shoulder mobility, pain, quality of life, and complications	Self-exercise program after 2 weeks of surgery	Shoulder immobilization for 4 weeks (conventional protocol)	- Initial assessment: 1 week post-operatively - I follow-up: 1 month post-operatively - II follow-up: 2 months post-operatively	Time elapsed between surgery and start of intervention: 2 weeks after surgery Intervention: - Immobilize the operated side shoulder for 2 weeks - Self-exercise program after immobilization period - The exercise program: 6 types of progressive shoulder-stretch exercises, beach pose, chest stretch, and biceps curl with low weight - 5 to 10 repetitions, performed 4 times a day, 7 days per week Comparison: - Immobilize the operated side shoulder for 4 weeks - Self-exercise program after immobilization period
Rizzi (2020) Brazil	To evaluate the effect of limiting shoulder ROM for 15 or 30 days on surgical complications, ROM, pain and upper limb function in breast cancer patients undergoing mastectomy and immediate implant-based reconstruction	Exercises and ADL's at PO15 in free amplitude.	Exercises and ADL's at PO30 in free amplitude.	- Initial assessment: preoperative - Follow-ups: 7, 15, 30, 60, and 90 days after surgery	Time elapsed between surgery and start of intervention: the day before surgery (mobilization) + exercise 2 weeks after surgery Exercise protocol started the day after surgery for both groups: - 6 exercises limited to 90º - Not to lift upper limbs beyond shoulder height and kept at home daily - 1 to 3 times a day Intervention: - At PO15 patients were allowed to perform exercises and ADL's in free amplitude Comparison - At PO30 patients were allowed to perform exercises and ADL's in free amplitude
Rizzi (2021) Brazil	To evaluate the effect of limiting shoulder ROM for 15 or 30 days on surgical complications, ROM, pain and upper limb function in patients with breast cancer after conservative oncoplastic surgery	Exercises and ADL's at PO15 in free amplitude.	Exercises and ADL's at PO30 in free amplitude.	- Initial assessment: preoperative - Follow-ups: 7, 15, 30, 60, and 90 days after surgery	Time elapsed between surgery and start of intervention: the day before surgery (mobilization) + exercise 2 weeks after surgery Exercise protocol started the day after surgery for both groups: - 6 exercises limited to 90º - Not to lift upper limbs beyond shoulder height and kept at home daily - 1 to 3 times a day Intervention: - At PO15 patients were allowed to perform exercises and ADL's in free amplitude Comparison - At PO30 patients were allowed to perform exercises and ADL's in free amplitude

Table 3 - Outcomes evaluated by each of the studies included in the systematic review (SR) and meta-analysis (MA).

Author	Publication year	Outcomes						
		Functionality	ROM	MS	Pain	QOL	Scar complications	Adverse events
Futter et al.	2003			SR		SR		
Dion et al.	2016				SR			
Kim et al.	2019	SR	SR/MA		SR	SR	SR	SR
Rizzi et al.	2020	SR	SR/MA		SR		SR	SR
Rizzi et al.	2021	SR	SR/MA		SR		SR	SR

Table 4 - Grading of Recommendations Assessment, Development and Evaluation (GRADE).

Certainty assessment							Number of patients		Effect		Certainty
№ of studies	Study design	Risk of bias	Inconsistency	Indirect evidence	Imprecision	Other considerations	Early exercises (15 days after surgery)	Late exercises (30 days after surgery	Relative (95% CI)	Absolute (95% CI)	
Flexion											
3	Randomized clinical trial	serious[a,b]	not serious	not serious	serious[b]	significant association	109	126	-	MD **6.26 higher** (2.92 to 9.61)	⊕⊕⊕⊕ High
Abduction											
3	Randomized clinical trial	serious[a,b]	not serious	not serious	serious[b]	significant association	109	126	-	MD **11.01 higher** (4.07 to 17.96)	⊕⊕⊕⊕ High
Internal rotation											
3	Randomized clinical trial	serious[a,b]	serious	not serious	serious[b]	not significant	109	126	-	MD **1.2 higher** (-3.77 to 6.17)	⊕◯◯◯ Very low
External rotation											
3	Randomized clinical trial	serious[a,b]	serious	not serious	serious[b]	not significant	109	126	-	MD **1.17 mais alto** (-2.28 to 4.62)	⊕◯◯◯ Very low

CI: Confidence interval; **MD:** Mean difference

Explanations

a. Randomisation process, since one of the studies was case-control (Kim, 2019);

b. Measurements: for one study (Kim, 2019), ROM differences were derived from published graphical depictions and not provided in tables

c. High effect heterogeneity

Figure 1 – PRISMA™flowchart.

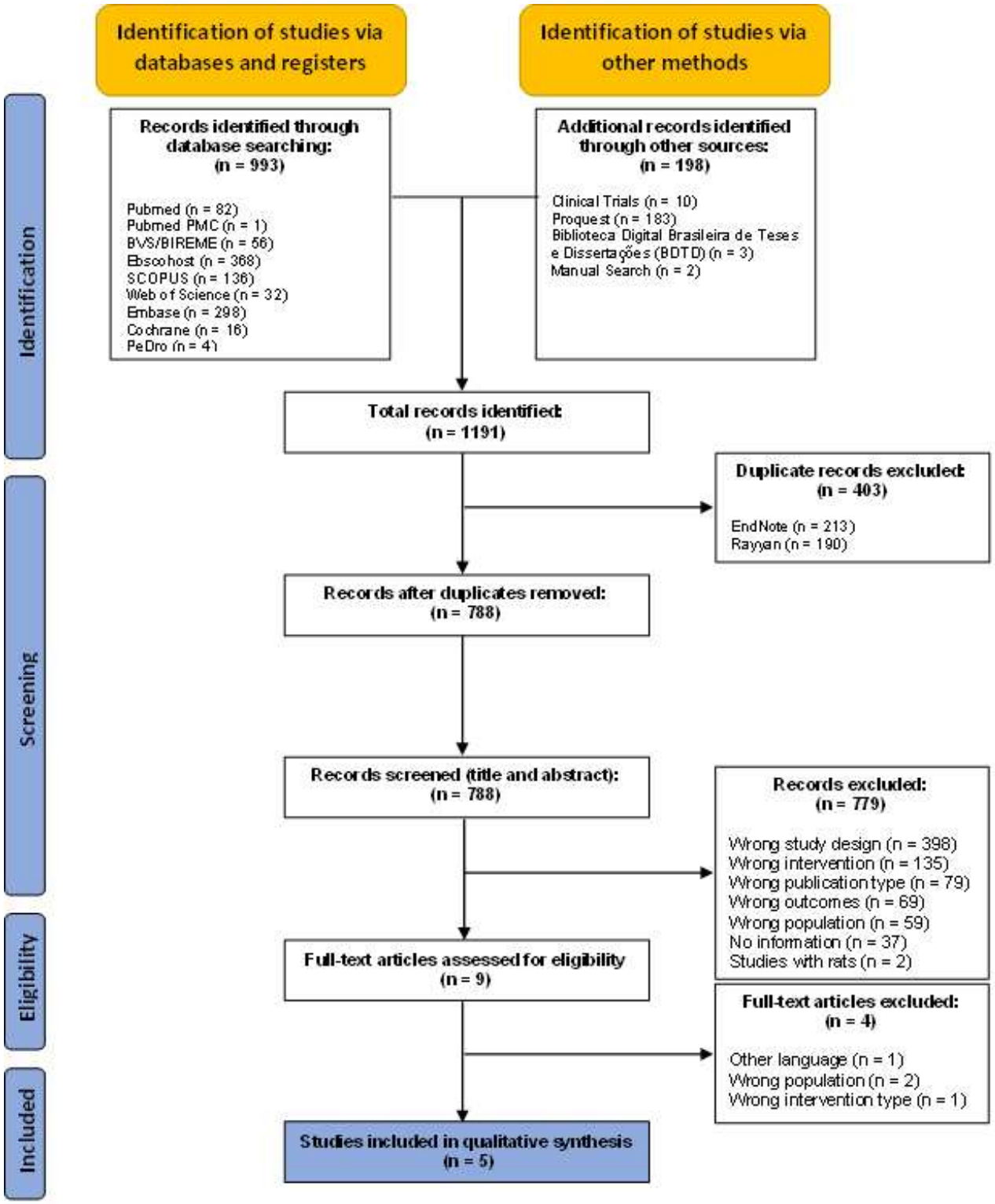


Figure 2 – Cochrane risk-of-bias

Intention-to-treat

Unique ID	Study ID	Experimental	Comparator	Outcome	Weight	D1	D2	D3	D4	D5	Overall
Kim et al., 2019	31598346	Exercise free 15 days	Exercise free 30 days	Functionality (DASH)	1	-	+	-	-	!	-
Rizzi et al., 2020	32725529	Exercise free 15 days	Exercise free 30 days	Functionality (DASH)	1	+	+	+	+	+	+
Rizzi et al., 2021	33731646	Exercise free 15 days	Exercise free 30 days	Functionality (DASH)	1	+	+	+	+	+	+
Kim et al., 2019	31598346	Exercise free 15 days	Exercise free 30 days	Range of motion	1	-	+	+	-	!	-
Rizzi et al., 2020	32725529	Exercise free 15 days	Exercise free 30 days	Range of motion	1	+	+	+	+	+	+
Rizzi et al., 2021	33731646	Exercise free 15 days	Exercise free 30 days	Range of motion	1	+	+	+	+	+	+
Futter et al., 2003	12969666	Pre-operative abdominal exercises	Control	Abdominal Muscular Strenght	1	-	+	-	+	+	-
Dion et al., 2016	25986296	Massage therapy and meditation	Massage therapy alone	Pain	1	!	+	+	-	+	-
Kim et al., 2019	31598346	Exercise free 15 days	Exercise free 30 days	Pain	1	-	+	-	-	!	-
Rizzi et al., 2020	32725529	Exercise free 15 days	Exercise free 30 days	Pain	1	+	+	+	+	+	+
Rizzi et al., 2021	33731646	Exercise free 15 days	Exercise free 30 days	Pain	1	+	+	+	+	+	+
Futter et al., 2003	12969666	Pre-operative abdominal exercises	Control	Quality of life (SF-36)	1	-	+	-	-	!	-
Kim et al., 2019	31598346	Exercise free 15 days	Exercise free 30 days	Quality of life (SF-36)	1	-	+	-	-	!	-

Figure 3 – Forest Plot Meta-analysis range of motion: flexion

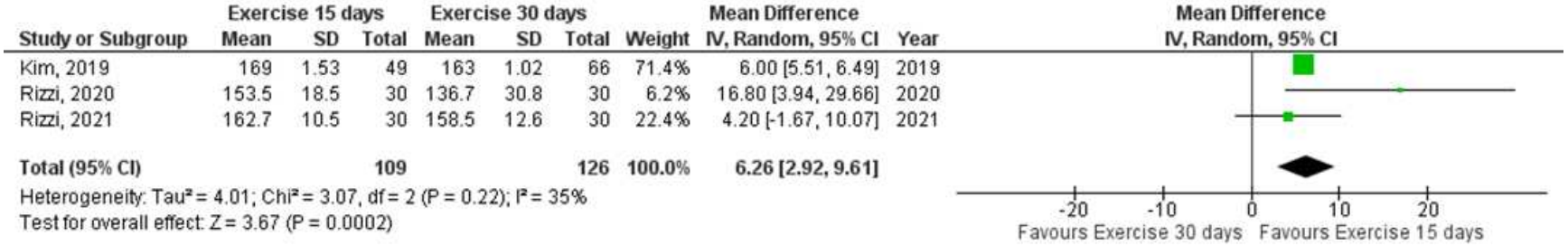


Figure 4 – Forest Plot Meta-analysis range of motion: abduction

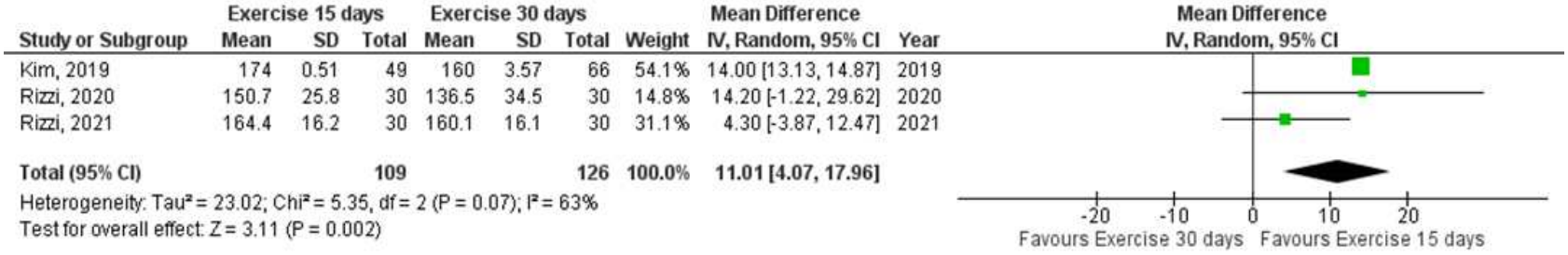


Figure 5 – Forest Plot Meta-analysis range of motion: internal rotation

Study or Subgroup	Exercise 15 days Mean	SD	Total	Exercise 30 days Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Year
Kim, 2019	88	1.02	49	90	0.1	66	43.6%	-2.00 [-2.29, -1.71]	2019
Rizzi, 2020	79.2	11.3	30	77.3	13.1	30	26.0%	1.90 [-4.29, 8.09]	2020
Rizzi, 2021	81.8	8.6	30	76.6	11	30	30.3%	5.20 [0.20, 10.20]	2021
Total (95% CI)			**109**			**126**	**100.0%**	**1.20 [-3.77, 6.17]**	

Heterogeneity: Tau² = 14.73; Chi² = 9.45, df = 2 (P = 0.009); I² = 79%
Test for overall effect: Z = 0.47 (P = 0.64)

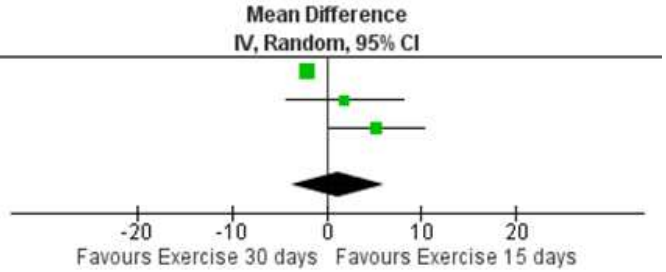
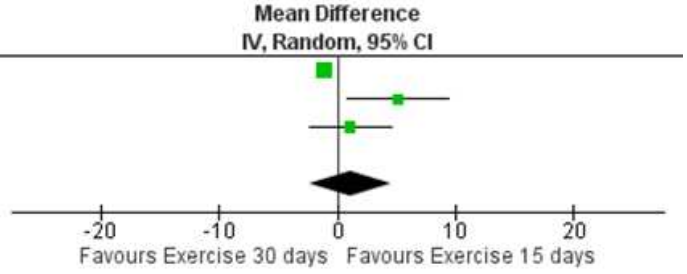


Figure 6 – Forest Plot Meta-analysis range of motion: external rotation

Study or Subgroup	Exercise 15 days Mean	SD	Total	Exercise 30 days Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI	Year
Kim, 2019	88.8	0.1	49	89.9	0.46	66	43.8%	-1.10 [-1.21, -0.99]	2019
Rizzi, 2020	86.3	8	30	81.2	9.1	30	25.9%	5.10 [0.76, 9.44]	2020
Rizzi, 2021	85.9	8	30	84.8	5.5	30	30.3%	1.10 [-2.37, 4.57]	2021
Total (95% CI)			**109**			**126**	**100.0%**	**1.17 [-2.28, 4.62]**	

Heterogeneity: Tau² = 7.07; Chi² = 9.38, df = 2 (P = 0.009); I² = 79%
Test for overall effect: Z = 0.67 (P = 0.51)



5. DISCUSSÃO

Nesta dissertação, procuramos realizar a revisão sistemática da literatura sobre intervenções fisioterapêuticas em mulheres com câncer de mama, submetidas a reconstrução mamária. Nas circunstâncias em que foi tecnicamente possível, também procedemos com a meta análise dos resultados de intervenções fisioterapêuticas para alguns aspectos relacionados à recuperação da funcionalidade do membro superior. Nos pareceu natural também que, em função daquilo que a revisão sistemática e meta análise revelasse em relação a lacunas de conhecimento, fizéssemos uma proposta de continuidade da investigação sobre o assunto. Desta forma, além da revisão sistemática e meta análise, apresentamos nesta dissertação a proposta que delineamos para contribuir com a construção do conhecimento sobre recuperação funcional em mulheres submetidas a reconstrução imediata, mais especificamente um ensaio clínico randomizado abordando técnicas e temporalidade de intervenções fisioterapêuticas nesse subgrupo relativamente pouco estudado de mulheres com câncer de mama.

A pergunta que suscitou o desenvolvimento desta dissertação veio da vivência clínica no Hospital da Mulher Prof. Dr. José Aristodemo Pinotti - Caism/Unicamp no manejo de mulheres submetidas a reconstrução mamária. Vale notar, o Caism/Unicamp é um dos hospitais públicos pioneiros na realização do procedimento, cuja introdução no cotidiano do tratamento oncológico remonta à década de 1980, por obra de profissionais como os Professores Edwald Merlin Keppke e Henrique Benedito Brenelli, entre tantos outros. Desta feita, a expertise institucional no que tange à reconstrução mamária é ampla e, ainda assim, restam dúvidas sobre o manejo pós-operatório das pacientes. Esta dissertação, como se

depreende dos resultados do artigo apresentado, não respondeu à pergunta em sua integralidade, mas apontou o caminho a ser seguido para que respostas mais sólidas e detalhadas possam ser obtidas. Destarte, tampouco a literatura atual sobre o tema traz ampla documentação que assegure a segurança da realização de procedimentos fisioterapêuticos nessa coorte cada vez mais ampla de pacientes.

Durante a realização desta revisão sistemática e meta análise, deparamos com lacunas ainda não preenchidas pela literatura, que são condizentes com as dúvidas que se acumulam da prática diária da fisioterapia em nosso centro. De fato, acreditávamos inicialmente que uma análise retrospectiva do próprio conjunto de dados nas bases do Caism/Unicamp poderia ajudar a sanar algumas dúvidas sobre os desfechos físicos e funcionais das mulheres submetidas a reconstrução mamária e seguidas em nosso Programa de Reabilitação no pós-operatório. As pacientes incluídas neste estudo retrospectivo realizaram RMI com uso de tecido autólogo, heterólogo ou ambos, visto que a equipe de cirurgia oncológica mamária e de cirurgia plástica do Caism/Unicamp tem domínio de praticamente todas as técnicas atualmente disponíveis para reconstrução mamária, com exceção de técnicas microcirúrgicas como retalhos livres.

O período coberto em nosso estudo retrospectivo (2010 a 2019) se limita a uma fração do histórico do hospital no campo da reconstrução mamária e da fisioterapia nos cuidados pós-operatórios, mas abrange os dados já introduzidos em prontuário eletrônico e de melhor representatividade da prática clínica contemporânea. Chamou-nos à atenção o fato de que a atuação da fisioterapia em nosso serviço se inicia, em média, após 38 dias da cirurgia. A complicação mais prevalente foi a aderência cicatricial, sendo que esta demonstrou associação com a restrição de ADM do ombro. A associação de tecido autólogo e heterólogo nas RMI,

assim como a presença de rede de cordões axilares no pós-operatório, também demonstraram associação com a restrição de ADM do ombro. Ao final do Programa de Reabilitação mais de 80% das pacientes apresentaram ADM funcional. Nossos achados, em que pesem todas as limitações metodológicas do estudo, são de certa monta encorajadores, posto que a incidência de complicações em nossa casuística é semelhante à encontrada na incipiente literatura disponível sobre o assunto, para pacientes que não foram submetidas a reconstrução mamária.

Contudo, nossos dados, dada a característica do próprio serviço em dar início aos cuidados de reabilitação mais de 30 dias, em média, do ato operatório, não respondem à dúvida fundamental se intervenções ainda mais precoces (por exemplo, 15 dias após a cirurgia) seriam seguras. Igualmente relevante, além da segurança em relação às complicações, não responde à hipótese de que intervenções mais precoces possam resultar em respostas clínicas mais rápidas e completas. Outra questão interessante, é se o atendimento individual, tão prevalente em nosso serviço, não dispõe de bases teóricas sólidas que justifiquem sua existência e, quaisquer que sejam as evidências em relação a pertinência desse atendimento individual, favoráveis ou não, é necessário documentá-las para os recursos terapêuticos sejam empregados da forma mais eficiente possível.

Foi das indagações mencionadas acima que derivamos a proposta da meta-análise, cujos resultados permitem entrever duas realidades: 1) a literatura sobre os cuidados de reabilitação em mulheres submetidas a reconstrução mamária é muito menos abundante e qualificada que aquela relativa às mulheres que não foram tratadas com reconstrução; 2) os poucos dados disponíveis sugerem que o início precoce da reabilitação pode trazer resultados funcionais mais expressivos que o início mais tardio (para além de 30 dias após a cirurgia). Contudo, os dados e

análises disponíveis na literatura são limitados em diversas frentes: i) pequenas coortes; ii) grupos de pesquisa semelhantes; iii) diferenças se apresentam em poucos aspectos da recuperação pós-operatória, particularmente na amplitude da flexão e abdução do ombro, embora múltiplos outros fatores componham as necessidades de recuperação funcional das mulheres submetidas a cirurgias mamárias; iv) há diferentes técnicas de reabilitação nos estudos incluídos e na forma de avaliação das pacientes incluídas nos estudos.

Avaliando em conjunto os resultados da revisão sistemática e meta análise, bem como os achados do estudo retrospectivo, nos pareceu natural e necessário o desenvolvimento de um estudo que abordasse ainda mais as lacunas encontradas, visto que as evidências encontradas são de baixa qualidade metodológica. Propusemos então um ensaio clínico randomizado que investigue a atuação fisioterapêutica no pós-operatório de mulheres com reconstrução mamária por câncer de mama. Consideramos essa atuação de maneira precoce e tardia, tendo início com 15 e 30 dias após a cirurgia. Também levantamos aqui a importância em utilizar mais de uma técnica fisioterapêutica na abordagem deste subgrupo de mulheres. Para isso optamos por utilizar não só os exercícios ativos de membros superiores, como também a aplicação de técnicas de terapia manual. Esse ensaio clínico foi desenvolvido com a randomização das participantes em 4 grupos e será realizado de maneira multicêntrica, em parceria com o Instituto Nacional do Câncer - INCA e a Universidade Federal de Minas Gerais - UFMG.

O desenvolvimento desta dissertação de mestrado foi uma oportunidade de revisitar um tema de importância na prática da fisioterapia, e procurar sanar dúvidas que permeiam não só a atuação do fisioterapeuta, mas também das equipes médicas que contam com a reabilitação funcional para dar melhor qualidade de vida

pós-operatória às mulheres tratadas cirurgicamente para o câncer de mama. Os dados aqui levantados e analisados, ainda que em sua precariedade, nos prontificaram a seguir na investigação do tema, a fim de melhor responder a questões mais específicas sobre a pertinência, segurança e temporalidade das intervenções pós-operatórias voltadas à recuperação funcional dos membros superiores após reconstrução mamária. Vale notar, e essa é uma impressão recorrente entre fisioterapeutas e médicos, é possível que intervenções mais intensivas e precoces - cujos resultados já estão beneficiando pacientes não submetidas a reconstrução mamária - estejam deixando de ser ofertadas às mulheres que fizeram reconstrução por falta de dados que assegurem a segurança dessas intervenções. Os resultados desta dissertação permitiram avaliar o estado atual do conhecimento sobre o assunto e, com isso, definir os próximos investigativos a serem dados no sentido de continuar construindo evidências sólidas que embasem as práticas de reabilitação em mulheres com reconstrução mamária por câncer de mama.

6. CONCLUSÃO

O presente estudo teve como foco revisar sistematicamente a literatura acerca das intervenções fisioterapêuticas utilizadas na prevenção de distúrbios físico funcionais em mulheres com câncer de mama submetidas à reconstrução mamária. Nossos resultados sugerem que iniciar exercícios ativos de membros superiores com 15 dias de pós-operatório não só é seguro, como também demonstra maiores benefícios quando comparado ao início tardio. Além disso, detectamos outras possibilidades de técnicas fisioterapêuticas para além dos exercícios, como o uso de técnicas de terapia manual e meditação.

Levando em conta a questionável qualidade metodológica dos estudos revisados e que apenas alguns aspectos da recuperação pós-operatória foram adequadamente estudados, propusemos a realização de um ensaio clínico randomizado, comparando o início precoce versus tardio de exercícios ativos exclusivos ou associados à terapia manual. Esperamos assim testar os achados desta revisão sistemática e meta-análise, bem como examinar o uso de outras técnicas fisioterapêuticas para a reabilitação pós-operatória desse subgrupo de mulheres.

Com os resultados apresentados neste estudo, é possível fortalecer e atualizar as atuais abordagens fisioterapêuticas no pós-operatório de reconstrução mamária para uma atuação mais segura e eficaz. Ademais, propomos um direcionamento para um estudo intervencional com a finalidade de contribuir para o conhecimento atual sobre o tema.

7. REFERÊNCIAS

1. World Health Organization (WHO). Breast cancer: prevention and control [Internet]. [cited 2020 Apr 22]. Available from: https://www.who.int/cancer/detection/breastcancer/en/

2. Ghoncheh M, Pournamdar Z, Salehiniya H. Incidence and Mortality and Epidemiology of Breast Cancer in the World. Asian Pacific J Cancer Prev. 2016;17:43–6.

3. Ahmad A. Breast Cancer Metastasis and Drug Resistance: Challenges and Progress. Vol. 1152, Springer Nature. 2019.

4. Instituto Nacional de Câncer (INCA). Definição do câncer de mama e dados de incidência e mortalidade no Brasil [Internet]. 2022 [cited 2022 Dec 20]. Available from:https://www.gov.br/inca/pt-br/assuntos/gestor-e-profissional-de-saude/controle-do-cancer-de-mama/conceito-e-magnitude

5. Instituto Nacional de Câncer (INCA). Câncer de Mama [Internet]. 2019. Available from: https://www.inca.gov.br/tipos-de-cancer/cancer-de-mama/profissional-de-saude

6. Rocco N, Rispoli C, Moja L, Amato B, Iannone L, Testa S, et al. Different types of implants for reconstructive breast surgery (Review). Cochrane Database Syst Rev. 2016; CD010895(5):61.

7. Zhang P, Li CZ, Wu CT, Jiao GM, Yan F, Zhu HC, et al. Comparison of immediate breast reconstruction after mastectomy and mastectomy alone for breast cancer: A meta-analysis. Eur J Surg Oncol. 2016;43(2):285–93.

8. Fang SY, Shu BC, Chang YJ. The effect of breast reconstruction surgery on body image among women after mastectomy: A meta-analysis. Breast Cancer Research and Treatment. 2013.

9. D'Souza N, Darmanin G, Fedorowicz Z. Immediate versus delayed reconstruction following surgery for breast cancer. Cochrane Database Syst Rev. 2011;(7).

10. Siotos C, Naska A, Bello RJ, Uzosike A, Orfanos P, Euhus DM, et al. Survival and Disease Recurrence Rates among Breast Cancer Patients following Mastectomy with or without Breast Reconstruction. Plast Reconstr Surg. 2019;144(2):169e-177e.

11. Anbiyaiee A, Abouali M, Dari G, Anbiyaee O, Anbiyaiee A. Breast

Reconstruction after Mastectomy in Women with Breast Cancer : A Systematic and Meta-Analysis Review. 2020;9(1):3–9.

12. Saliba GAM, Carvalho EES de, Filho AF da S, Alves JCRR, Tavares MV, Costa SM da, et al. Reconstrução mamária : análise de tendências e suas complicações maiores. Rev Bras Cir Plástica. 2013;28(4):619–26.

13. Ministério da Saúde. Câncer de mama: sintomas, tratamentos, causas e prevenção [Internet]. [cited 2020 Apr 25]. Available from: https://www.saude.gov.br/saude-de-a-z/cancer-de-mama

14. Jagsi R, Jiang J, Momoh AO, Alderman A, Giordano SH, Buchholz TA, et al. Complications After Mastectomy and Immediate Breast Reconstruction for Breast Cancer. Ann Surg. 2016;263(2):219–27.

15. Teixeira LFN, Sandrin F. The role of the physiotherapy in the plastic surgery patients after oncological breast surgery. Gland Surg. 2014;3(1):43–7.

16. Oliveira GS De, Bialek JM, Nicosia L, Mccarthy RJ, Chang R, Fitzgerald P, et al. Lack of association between breast reconstructive surgery and the development of chronic pain after mastectomy : A propensity matched retrospective cohort analysis. The Breast [Internet]. 2014;23(4):329–33. Available from: http://dx.doi.org/10.1016/j.breast.2014.01.003

17. Monteiro M. Physical Therapy Implications Following the TRAM Procedure. Phys Ther. 1997;77(7):765–70.

18. Oliveira RR De, Silva MPP e, Gurgel MaSC, Pastori-Filho L, Sarian LO. Immediate Breast Reconstruction With Transverse Latissimus Dorsi Flap Does Not Affect the Short-term Recovery of Shoulder Range of Motion After Mastectomy. Ann Plast Surg. 2010;64(4):402–308.

19. Kim DH, Glazer PA. Progression of Idiopathic Thoracolumbar Scoliosis After Breast Reconstruction With a Latissimus Dorsi Flap A Case Report. 2000;25(5):622–5.

20. Glassey N, Perks GB, McCulley SJ. A Prospective Assessment of Shoulder Morbidity and Recovery Time Scales following Latissimus Dorsi Breast Reconstruction. Plast Reconstr Surg. 2008;122(5):1334–40.

21. Harmeling JX, Kouwenberg CAE, Bijlard E, Burger KNJ, Jager A, Mureau MAM. The effect of immediate breast reconstruction on the timing of adjuvant chemotherapy: a systematic review. Breast Cancer Res Treat. 2015;153(2):241–51.

22. McNeely ML, Campbell K, Ospina M, Rowe BH, Dabbs K, Klassen TP, et al. Exercise Interventions for Upper Limb Dysfunction Due to Breast Cancer Treatment. Cochrane Database Syst Rev. 2010;(6).
23. Lahart IM, Metsios GS, Nevill AM, Carmichael AR. Physical activity for women with breast cancer after adjuvant therapy. Cochrane Database Syst Rev. 2018;(1).
24. Groef A De, Kampen M Van, Dieltjens E, Christiaens M, Neven P, Geraerts I, et al. Effectiveness of Postoperative Physical Therapy for Upper-Limb Impairments After Breast Cancer Treatment: A Systematic Review. Arch Phys Med Rehabil [Internet]. 2015;96(6):1140–1053. Available from: http://dx.doi.org/10.1016/j.apmr.2015.01.006
25. Amaral MTP do, Teixeira LC, Derchain SFM, Nogueira MD, Pinro e Silva MP, Gonçalves A de V. Orientação Domiciliar: Proposta De Reabilitação Física Para Mulheres Submetidas À Cirurgia Por Câncer De Mama. Rev Ciênc Méd. 2005;14(5):405–13.
26. Groef A De, Van Kampen M, Vervloesem N, Dieltjens E, Christiaens MR, Neven P, et al. Effect of myofascial techniques for treatment of persistent arm pain after breast cancer treatment: randomized controlled trial. Clin Rehabil. 2018;32(4):451–61.
27. Cho Y, Do J, Jung S, Kwon O, Jeon JY. Effects of a physical therapy program combined with manual lymphatic drainage on shoulder function , quality of life , lymphedema incidence , and pain in breast cancer patients with axillary web syndrome following axillary dissection. Support Care Cancer. 2015;24(5):2047–57.
28. Scaffidi M, Vulpiani MC, Vetrano M, Conforti F, Marchetti MR, Bonifacino A, et al. Early rehabilitation reduces the onset of complications in the upper limb following breast cancer surgery. Eur J Phys Rehabil Med. 2012;48(4):601–11.
29. Serra-añó P, Inglés M, Bou-catalá C, Iraola-lliso A, Espí-lópez GV. Effectiveness of myofascial release after breast cancer surgery in women undergoing conservative surgery and radiotherapy : a randomized controlled trial. Support Care Cancer. 2018;27(7):2633–41.
30. Oliveira MMF de, Rezende LF, Amaral MTP do, Silva MPP e, Morais SS, Gurgel MSC. Manual lymphatic drainage versus exercise in the early postoperative period for breast cancer. Physiother Theory Pract. 2014;30(6):384–9.
31. Lozano-Lozano M, Martín-Martín L, Galiano-Castillo N, Fernández-Lao C,

Cantarero-Villanueva I, López-Barajas IB, et al. Mobile health and supervised rehabilitation versus mobile health alone in breast cancer survivors: Randomized controlled trial. Ann Phys Rehabil Med. 2020;

32. Ream E, Hughes AE, Cox A, Skarparis K, Richardson A, Pedersen VH, et al. Telephone interventions for symptom management in adults with cancer. Cochrane Database of Systematic Reviews. 2020.

33. Kim KH, Yeo SM, Cheong IY, Kim Y, Jeon BJ, Hwang JH. Early rehabilitation after total mastectomy and immediate reconstruction with tissue expander insertion in breast cancer patients: A retrospective case-control study. J Breast Cancer. 2019;22(3):472–83.

34. Woo KJ, Lee KT, Mun GH, Pyon JK, Bang SI. Effect of breast reconstruction modality on the development of postmastectomy shoulder morbidity. J Plast Reconstr Aesthetic Surg [Internet]. 2018;71(12):1761–7. Available from: https://doi.org/10.1016/j.bjps.2018.07.033

35. Unukovych D, Johansson H, Johansson E, Arver B, Liljegren A, Brandberg Y. Physical therapy after prophylactic mastectomy with breast reconstruction : A prospective randomized study. The Breast [Internet]. 2014;1–7. Available from: http://dx.doi.org/10.1016/j.breast.2014.01.010

36. Sudarshan M, Petrucci A, Dumitra S, Duplisea J, Wexler S, Meterissian S. Yoga therapy for breast cancer patients : A prospective cohort study. Complement Ther Clin Pract [Internet]. 2013;19(4):227–9. Available from: http://dx.doi.org/10.1016/j.ctcp.2013.06.004

37. Dion LJ, Engen DJ, Lemaine V, Lawson DK, Brock CG, Thomley BS, et al. Massage therapy alone and in combination with meditation for breast cancer patients undergoing autologous tissue reconstruction : A randomized pilot study. Complement Ther Clin Pract [Internet]. 2016;23:82–7. Available from: http://dx.doi.org/10.1016/j.ctcp.2015.04.005

38. Rizzi SKLA, Haddad CAS, Giron PS, Figueira PVG, Estevão A, Elias S, et al. Early Free Range-of-Motion Upper Limb Exercises After Mastectomy and Immediate Implant-Based Reconstruction Are Safe and Beneficial: A Randomized Trial. Ann Surg Oncol. 2020;

39. Do Amaral MTP, De Oliveira MMF, Ferreira NDO, Guimarães RV, Sarian LO, Gurgel MSC. Manual therapy associated with upper limb exercises vs. exercises

alone for shoulder rehabilitation in postoperative breast cancer. Physiother Theory Pract. 2012;28(4):299–306.

40. Pilat A. Myofascial inductionapproaches. Fascia Tens Netw Hum Body-E-Book Sci Clin Appl Man Mov Ther, editor. 2013. 311 p.

41. Oliveira APM, Pereira KP, Felicio LR. Evidências da técnica de liberação miofascial no tratamento fisioterapêutico: revisão sistemática. Arq Ciências do Esporte. 2019.

42. Silva MPP e, Marques A de A, Amaral MTP do. Tratado de fisioterapia em saúde da mulher. 2nd ed. Editora Guanabara Koogan Ltda., editor. 2018. 472 p.

43. Ministério da Saúde, Secretaria de Atenção à Saúde, Secretaria de Ciência T e IE. Diretrizes Diagnósticas e Terapêuticas do Carcinoma de Mama - CONITEC. 2019.

8. APÊNDICES

APÊNDICE 1: Estratégias de busca

CRONOGRAMA DE BUSCAS

DATA	BASE DE DADOS	TEMPO DE ATENDIMENTO
24/07/2020	DECS MESH PUBMED	15:30 hs – 16:50hs (80 minutos)
07/08/2020	DECS MESH	09:00HS – 09:53HS (53 minutos) 11:25hs – 12:55hs (80 minutos)
21/08/2020	DECS MESH PUBMED	15:35hs – 17:15hs (90 minutos)
28/08/2020	DECS MESH PUBMED	12:05 HS– 13:38HS (93 MINUTOS)
28/08/2020	PUBMED PUBMED PMC BVS – BIREME EBSCOHOST SCOPUS WEB OF SCIENCE EMBASE COCHRANE PEDRO	17:00HS – 18:29HS (89 MINUTOS)
10/09/2020	RAYYAN	15:44HS – 17:02HS (78 minutos)

DESCRITORES UTILIZADOS

"Exercise Therapy" OR "Terapia por Ejercicio" OR "Terapia por Exercício"

Descritor *Inglês*:	**Exercise Therapy**
Descritor *Espanhol*:	**Terapia por Ejercicio**
Descritor *Português*:	**Terapia por Exercício**
Sinônimos *Português*:	Exercício Terapêutico Exercício de Reabilitação
Categoria:	E02.760.169.063.500.387 E02.779.483 E02.831.535.483
Definição *Português*:	Regime ou plano de atividades físicas concebido e prescrito para alcançar objetivos terapêuticos específicos. Seu propósito é restaurar a função musculosquelética normal ou reduzir dores causada por doenças ou lesões.
Nota de Indexação *Português*:	EXERCÍCIO também está disponível

MESH	**"Exercise Therapy" OR "Remedial Exercise" OR "Exercise, Remedial" OR "Exercises, Remedial" OR "Remedial Exercises" OR "Therapy, Exercise" OR "Exercise Therapies" OR "Therapies, Exercise" OR "Rehabilitation Exercise" OR "Exercise, Rehabilitation" OR "Exercises, Rehabilitation" OR "Rehabilitation Exercises"**

OR Rehabilitation OR Rehabilitación OR Reabilitação

Descritor *Inglês*:	**Rehabilitation**
Descritor *Espanhol*:	**Rehabilitación**
Descritor *Português*:	**Reabilitação**
Sinônimos *Português*:	Habilitação
Categoria:	E02.760.169.063.500 E02.831 H02.403.680.600 N02.421.784 SP4.046.442.633.869.155 SP8.946.117.208 VS4.002.001.002.003
Definição *Português*:	Recuperação das funções humanas ao maior grau possível, de uma pessoa ou pessoas que sofrem de uma doença ou lesão.

MESH	**Rehabilitation OR Habilitation**

OR "Physical Therapy Modalities" OR "Modalidades de Fisioterapia" OR "Modalidades de Fisioterapia"

Descritor *Inglês*:	**Physical Therapy Modalities**
Descritor *Espanhol*:	**Modalidades de Fisioterapia**
Descritor *Português*:	**Modalidades de Fisioterapia**
Sinônimos *Português*:	Fisioterapia (Técnicas) Fisioterapia Grupal

	Fisioterapia em Grupo Fisioterapias em Grupo Técnicas Fisioterápicas Técnicas de Fisioterapia
Categoria:	E02.779 E02.831.535
Definição *Português*:	Modalidades terapêuticas frequentemente utilizadas em FISIOTERAPIA por FISIOTERAPEUTAS para melhorar, manter ou restaurar o bem-estar físico e fisiológico de um indivíduo.

MESH	**"Physical Therapy Modalities" OR "Modalities, Physical Therapy" OR "Modality, Physical Therapy" OR "Physical Therapy Modality" OR "Physiotherapy (Techniques)" OR "Physiotherapies (Techniques)" OR "Physical Therapy Techniques" OR "Physical Therapy Technique" OR "Techniques, Physical Therapy" OR "Group Physiotherapy" OR "Group Physiotherapies" OR "Physiotherapies, Group" OR "Physiotherapy, Group" OR "Neurological Physiotherapy" OR "Physiotherapy, Neurological" OR Neurophysiotherapy**

AND "Breast Neoplasms" OR "Neoplasias de la Mama" OR "Neoplasias da Mama"

Descritor *Inglês*:	**Breast Neoplasms**
Descritor *Espanhol*:	**Neoplasias de la Mama**
Descritor *Português*:	**Neoplasias da Mama**
Sinônimos *Português*:	Carcinoma Mamário Humano Carcinoma de Mama Carcinomas Mamários Humanos Carcinomas da Mama Câncer Mamário Câncer da Mama Câncer de Mama Câncer de Seio Câncer do Seio Cânceres de Mama Neoplasia Maligna da Mama Neoplasia Maligna de Mama Neoplasia Mamária Neoplasia Mamária Humana Neoplasia da Mama Neoplasias Malignas de Mama Neoplasias Mamárias Neoplasias Mamárias Humanas Neoplasias de Mama Tumor Maligno da Mama Tumor da Mama Tumor de Mama Tumor de Seio Tumores Malignos da Mama Tumores Mamários Tumores da Mama Tumores de Mama Tumores de Seio
Categoria:	C04.588.180 C17.800.090.500
Definição *Português*:	Tumores ou câncer da MAMA humana.

MESH	**"Breast Neoplasms" OR "Breast Neoplasm" OR "Neoplasm, Breast" OR "Breast Tumors" OR "Breast Tumor" OR "Tumor, Breast" OR "Tumors, Breast" OR "Neoplasms, Breast" OR "Breast Cancer" OR "Cancer, Breast" OR "Mammary Cancer" OR "Cancer,**

	Mammary" OR "Cancers, Mammary" OR "Mammary Cancers" OR "Malignant Neoplasm of Breast" OR "Breast Malignant Neoplasm" OR "Breast Malignant Neoplasms" OR "Malignant Tumor of Breast" OR "Breast Malignant Tumor" OR "Breast Malignant Tumors" OR "Cancer of Breast" OR "Cancer of the Breast" OR "Mammary Carcinoma, Human" OR "Carcinoma, Human Mammary" OR "Carcinomas, Human Mammary" OR "Human Mammary Carcinomas" OR "Mammary Carcinomas, Human" OR "Human Mammary Carcinoma" OR "Mammary Neoplasms, Human" OR "Human Mammary Neoplasm" OR "Human Mammary Neoplasms" OR "Neoplasm, Human Mammary" OR "Neoplasms, Human Mammary" OR "Mammary Neoplasm, Human" OR "Breast Carcinoma" OR "Breast Carcinomas" OR "Carcinoma, Breast" OR "Carcinomas, Breast"

AND Mammaplasty OR Mamoplastia OR Mamoplastia

Descritor *Inglês*:	**Mammaplasty**
Descritor *Espanhol*:	**Mamoplastia**
Descritor *Português*:	**Mamoplastia**
Sinônimos *Português*:	Mastoplastia Reconstrução da Mama
Categoria:	E02.218.565 E04.680.500
Definição *Português*:	Reconstrução cirúrgica da mama, abrangendo tanto aumento quanto diminuição.

MESH	**Mammaplasty OR Mammaplasties OR Mammoplasty OR Mammoplasties OR "Breast Reconstruction" OR "Breast Reconstructions" OR "Reconstruction, Breast" OR "Reconstructions, Breast"**

BASES DE DADOS

https://www.fcm.unicamp.br/fcm/biblioteca-fcm/bases-em-saude-sbe

Fonte	Vocabulário de Assuntos	DESCRITORES E TERMOS LIVRES UTILIZADOS NA ESTRATÉGIA DE BUSCA				
		1	2	3	4	5
PUBMED	MeSH - Medical Subject Headings	"Exercise Therapy"	Rehabilitation	"Physical Therapy Modalities"	"Breast Neoplasms"	Mammaplasty
PUBMED PMC	MeSH - Medical Subject Headings	"Exercise Therapy"	Rehabilitation	"Physical Therapy Modalities"	"Breast Neoplasms"	Mammaplasty
BVS / BIREME	DeCS	"Exercise Therapy" "Terapia por Ejercicio" "Terapia por Exercício"	Rehabilitation Rehabilitación Reabilitação	"Physical Therapy Modalities" "Modalidades de Fisioterapia" "Modalidades de Fisioterapia"	"Breast Neoplasms" "Neoplasias de la Mama" "Neoplasias da Mama"	Mammaplasty Mamoplastia Mamoplastia
EBSCOHOST	Títulos CINAHL	"Exercise Therapy"	Rehabilitation	"Physical Therapy Modalities"	"Breast Neoplasms"	Mammaplasty
Scopus		"Exercise Therapy"	Rehabilitation	"Physical Therapy Modalities"	"Breast Neoplasms"	Mammaplasty
WEB OF SCIENCE		"Exercise Therapy"	Rehabilitation	"Physical Therapy Modalities"	"Breast Neoplasms"	Mammaplasty
EMBASE	Emtree	**exercise therapy use preferred term: kinesiotherapy**	Rehabilitation	physical therapy modalities use preferred term: physiotherapy	**breast neoplasms use preferred term: breast tumor**	**mammaplasty use preferred term: breast reconstruction**
Cochrane Library	MeSH - Medical	"Exercise Therapy"	Rehabilitation	"Physical Therapy Modalities"	"Breast Neoplasms"	Mammaplasty

	Subject Headings					
PEDRO	MeSH - Medical Subject Headings	"Exercise Therapy"	Rehabilitation	"Physical Therapy Modalities"	"Breast Neoplasms"	Mammaplasty
CLINICAL TRIALS		"Exercise Therapy"	Rehabilitation	"Physical Therapy Modalities"	"Breast Neoplasms"	Mammaplasty
PROQUEST		"Exercise Therapy"	Rehabilitation	"Physical Therapy Modalities"	"Breast Neoplasms"	Mammaplasty

ESTRATÉGIA DE BUSCA

("Exercise Therapy" OR Rehabilitation OR "Physical Therapy Modalities") AND Mammaplasty AND "Breast Neoplasms"

("Terapia por Exercício" OR Reabilitação OR "Modalidades de Fisioterapia") AND "Neoplasias da Mama" AND Mamoplastia

Fonte	Estratégia	Nº de Artigos	Data
PUBMED	(((((Exercise Therapy[MeSH Terms]) OR ("Exercise Therapy"[Title/Abstract] OR "Remedial Exercise"[Title/Abstract] OR "Exercise, Remedial"[Title/Abstract] OR "Exercises, Remedial"[Title/Abstract] OR "Remedial Exercises"[Title/Abstract] OR "Therapy, Exercise"[Title/Abstract] OR "Exercise Therapies"[Title/Abstract] OR "Therapies, Exercise"[Title/Abstract] OR "Rehabilitation Exercise"[Title/Abstract] OR "Exercise, Rehabilitation"[Title/Abstract] OR "Exercises, Rehabilitation"[Title/Abstract] OR "Rehabilitation Exercises"[Title/Abstract])) OR ((Rehabilitation[MeSH Terms]) OR (Rehabilitation[Title/Abstract] OR Habilitation[Title/Abstract]))) OR ((Physical Therapy Modalities[MeSH Terms]) OR ("Physical Therapy Modalities"[Title/Abstract] OR "Modalities, Physical Therapy"[Title/Abstract] OR "Modality, Physical Therapy"[Title/Abstract] OR "Physical Therapy Modality"[Title/Abstract] OR "Physiotherapy (Techniques)"[Title/Abstract] OR "Physiotherapies (Techniques)"[Title/Abstract] OR "Physical Therapy Techniques"[Title/Abstract] OR "Physical Therapy Technique"[Title/Abstract] OR "Techniques, Physical Therapy"[Title/Abstract] OR "Group Physiotherapy"[Title/Abstract] OR "Group Physiotherapies"[Title/Abstract] OR "Physiotherapies, Group"[Title/Abstract] OR "Physiotherapy, Group"[Title/Abstract] OR "Neurological Physiotherapy"[Title/Abstract] OR "Physiotherapy, Neurological"[Title/Abstract] OR Neurophysiotherapy[Title/Abstract]))) AND ((Breast Neoplasms[MeSH Terms]) OR ("Breast Neoplasms"[Title/Abstract] OR "Breast Neoplasm"[Title/Abstract] OR "Neoplasm, Breast"[Title/Abstract] OR "Breast Tumors"[Title/Abstract] OR "Breast Tumor"[Title/Abstract] OR "Tumor, Breast"[Title/Abstract] OR "Tumors, Breast"[Title/Abstract] OR "Neoplasms, Breast"[Title/Abstract] OR "Breast Cancer"[Title/Abstract] OR "Cancer, Breast"[Title/Abstract] OR "Mammary Cancer"[Title/Abstract] OR "Cancer, Mammary"[Title/Abstract] OR "Cancers, Mammary"[Title/Abstract] OR "Mammary Cancers"[Title/Abstract] OR "Malignant Neoplasm of Breast"[Title/Abstract] OR "Breast Malignant Neoplasm"[Title/Abstract] OR "Breast Malignant Neoplasms"[Title/Abstract] OR "Malignant Tumor of Breast"[Title/Abstract] OR "Breast Malignant Tumor"[Title/Abstract] OR "Breast Malignant Tumors"[Title/Abstract] OR "Cancer of Breast"[Title/Abstract] OR "Cancer of the Breast"[Title/Abstract] OR "Mammary Carcinoma, Human"[Title/Abstract] OR "Carcinoma, Human Mammary"[Title/Abstract] OR "Carcinomas, Human Mammary"[Title/Abstract] OR "Human Mammary Carcinomas"[Title/Abstract] OR "Mammary Carcinomas, Human"[Title/Abstract] OR "Human Mammary Carcinoma"[Title/Abstract] OR "Mammary Neoplasms, Human"[Title/Abstract] OR "Human Mammary Neoplasm"[Title/Abstract] OR "Human Mammary Neoplasms"[Title/Abstract] OR "Neoplasm, Human Mammary"[Title/Abstract] OR "Neoplasms, Human Mammary"[Title/Abstract] OR "Mammary Neoplasm,	82	28/08/2020

	Human"[Title/Abstract] OR "Breast Carcinoma"[Title/Abstract] OR "Breast Carcinomas"[Title/Abstract] OR "Carcinoma, Breast"[Title/Abstract] OR "Carcinomas, Breast"[Title/Abstract])))) AND ((Mammaplasty[MeSH Terms]) OR (Mammaplasty[Title/Abstract] OR Mammaplasties[Title/Abstract] OR Mammoplasty[Title/Abstract] OR Mammoplasties[Title/Abstract] OR "Breast Reconstruction"[Title/Abstract] OR "Breast Reconstructions"[Title/Abstract] OR "Reconstruction, Breast"[Title/Abstract] OR "Reconstructions, Breast"[Title/Abstract]))		
PUBMED **PMC**	(((((Exercise Therapy[MeSH Terms]) OR ("Exercise Therapy"[Title/Abstract] OR "Remedial Exercise"[Title/Abstract] OR "Exercise, Remedial"[Title/Abstract] OR "Exercises, Remedial"[Title/Abstract] OR "Remedial Exercises"[Title/Abstract] OR "Therapy, Exercise"[Title/Abstract] OR "Exercise Therapies"[Title/Abstract] OR "Therapies, Exercise"[Title/Abstract] OR "Rehabilitation Exercise"[Title/Abstract] OR "Exercise, Rehabilitation"[Title/Abstract] OR "Exercises, Rehabilitation"[Title/Abstract] OR "Rehabilitation Exercises"[Title/Abstract])) OR ((Rehabilitation[MeSH Terms]) OR (Rehabilitation[Title/Abstract] OR Habilitation[Title/Abstract]))) OR ((Physical Therapy Modalities[MeSH Terms]) OR ("Physical Therapy Modalities"[Title/Abstract] OR "Modalities, Physical Therapy"[Title/Abstract] OR "Modality, Physical Therapy"[Title/Abstract] OR "Physical Therapy Modality"[Title/Abstract] OR "Physiotherapy (Techniques)"[Title/Abstract] OR "Physiotherapies (Techniques)"[Title/Abstract] OR "Physical Therapy Techniques"[Title/Abstract] OR "Physical Therapy Technique"[Title/Abstract] OR "Techniques, Physical Therapy"[Title/Abstract] OR "Group Physiotherapy"[Title/Abstract] OR "Group Physiotherapies"[Title/Abstract] OR "Physiotherapies, Group"[Title/Abstract] OR "Physiotherapy, Group"[Title/Abstract] OR "Neurological Physiotherapy"[Title/Abstract] OR "Physiotherapy, Neurological"[Title/Abstract] OR Neurophysiotherapy[Title/Abstract]))) AND ((Breast Neoplasms[MeSH Terms]) OR ("Breast Neoplasms"[Title/Abstract] OR "Breast Neoplasm"[Title/Abstract] OR "Neoplasm, Breast"[Title/Abstract] OR "Breast Tumors"[Title/Abstract] OR "Breast Tumor"[Title/Abstract] OR "Tumor, Breast"[Title/Abstract] OR "Tumors, Breast"[Title/Abstract] OR "Neoplasms, Breast"[Title/Abstract] OR "Breast Cancer"[Title/Abstract] OR "Cancer, Breast"[Title/Abstract] OR "Mammary Cancer"[Title/Abstract] OR "Cancer, Mammary"[Title/Abstract] OR "Cancers, Mammary"[Title/Abstract] OR "Mammary Cancers"[Title/Abstract] OR "Malignant Neoplasm of Breast"[Title/Abstract] OR "Breast Malignant Neoplasm"[Title/Abstract] OR "Breast Malignant Neoplasms"[Title/Abstract] OR "Malignant Tumor of Breast"[Title/Abstract] OR "Breast Malignant Tumor"[Title/Abstract] OR "Breast Malignant Tumors"[Title/Abstract] OR "Cancer of Breast"[Title/Abstract] OR "Cancer of the Breast"[Title/Abstract] OR "Mammary Carcinoma, Human"[Title/Abstract] OR "Carcinoma, Human Mammary"[Title/Abstract] OR "Carcinomas, Human Mammary"[Title/Abstract] OR "Human Mammary Carcinomas"[Title/Abstract] OR "Mammary Carcinomas, Human"[Title/Abstract] OR "Human Mammary Carcinoma"[Title/Abstract] OR "Mammary Neoplasms, Human"[Title/Abstract] OR "Human Mammary Neoplasm"[Title/Abstract] OR "Human Mammary Neoplasms"[Title/Abstract] OR "Neoplasm, Human Mammary"[Title/Abstract] OR "Neoplasms, Human Mammary"[Title/Abstract] OR "Mammary Neoplasm, Human"[Title/Abstract] OR "Breast Carcinoma"[Title/Abstract] OR "Breast Carcinomas"[Title/Abstract] OR "Carcinoma, Breast"[Title/Abstract] OR "Carcinomas, Breast"[Title/Abstract])))) AND ((Mammaplasty[MeSH Terms]) OR (Mammaplasty[Title/Abstract] OR Mammaplasties[Title/Abstract] OR Mammoplasty[Title/Abstract] OR Mammoplasties[Title/Abstract] OR "Breast Reconstruction"[Title/Abstract] OR "Breast Reconstructions"[Title/Abstract] OR "Reconstruction, Breast"[Title/Abstract] OR "Reconstructions, Breast"[Title/Abstract]))	01	28/08/2020
BVS / BIREME	tw:((tw:("Exercise Therapy" OR "Terapia por Ejercicio" OR "Terapia por Exercício" OR rehabilitation OR rehabilitación OR reabilitação OR	56	04/09/2020

LILACS (28) IBECS (26) BDENF - Enfermagem (3) BINACIS (3)	"Physical Therapy Modalities" OR "Modalidades de Fisioterapia" OR "Modalidades de Fisioterapia")) AND (tw:("Breast Neoplasms" OR "Neoplasias de la Mama" OR "Neoplasias da Mama")) AND (tw:(mammaplasty OR mamoplastia OR mamoplastia))) AND (db:("LILACS" OR "IBECS" OR "BDENF" OR "BINACIS"))		
EBSCOHOST **440** **MEDLINE 289** **CINAHL with Full Text 73** **Academic Search Premier 32** **Academic Search Ultimate 32** **Fonte Acadêmica 4** **SPORTDiscus with Full Text 3** **SocINDEX with Full Text 2** **Sociology Source Ultimate 2** **CAPES FSTA Full Text Collection 1** **Food Science Source 1** **Applied Science & Technology Source Ultimate 1**	(("Exercise Therapy" OR "Remedial Exercise" OR "Exercise, Remedial" OR "Exercises, Remedial" OR "Remedial Exercises" OR "Therapy, Exercise" OR "Exercise Therapies" OR "Therapies, Exercise" OR "Rehabilitation Exercise" OR "Exercise, Rehabilitation" OR "Exercises, Rehabilitation" OR "Rehabilitation Exercises") OR (Rehabilitation OR Habilitation) OR ("Physical Therapy Modalities" OR "Modalities, Physical Therapy" OR "Modality, Physical Therapy" OR "Physical Therapy Modality" OR "Physiotherapy (Techniques)" OR "Physiotherapies (Techniques)" OR "Physical Therapy Techniques" OR "Physical Therapy Technique" OR "Techniques, Physical Therapy" OR "Group Physiotherapy" OR "Group Physiotherapies" OR "Physiotherapies, Group" OR "Physiotherapy, Group" OR "Neurological Physiotherapy" OR "Physiotherapy, Neurological" OR Neurophysiotherapy)) AND ("Breast Neoplasms" OR "Breast Neoplasm" OR "Neoplasm, Breast" OR "Breast Tumors" OR "Breast Tumor" OR "Tumor, Breast" OR "Tumors, Breast" OR "Neoplasms, Breast" OR "Breast Cancer" OR "Cancer, Breast" OR "Mammary Cancer" OR "Cancer, Mammary" OR "Cancers, Mammary" OR "Mammary Cancers" OR "Malignant Neoplasm of Breast" OR "Breast Malignant Neoplasm" OR "Breast Malignant Neoplasms" OR "Malignant Tumor of Breast" OR "Breast Malignant Tumor" OR "Breast Malignant Tumors" OR "Cancer of Breast" OR "Cancer of the Breast" OR "Mammary Carcinoma, Human" OR "Carcinoma, Human Mammary" OR "Carcinomas, Human Mammary" OR "Human Mammary Carcinomas" OR "Mammary Carcinomas, Human" OR "Human Mammary Carcinoma" OR "Mammary Neoplasms, Human" OR "Human Mammary Neoplasm" OR "Human Mammary Neoplasms" OR "Neoplasm, Human Mammary" OR "Neoplasms, Human Mammary" OR "Mammary Neoplasm, Human" OR "Breast Carcinoma" OR "Breast Carcinomas" OR "Carcinoma, Breast" OR "Carcinomas, Breast") AND (Mammaplasty OR Mammaplasties OR Mammoplasty OR Mammoplasties OR "Breast Reconstruction" OR "Breast Reconstructions" OR "Reconstruction, Breast" OR "Reconstructions, Breast")	368	28/08/2020
SCOPUS	(TITLE-ABS-KEY ("Exercise Therapy" OR "Remedial Exercise" OR "Exercise, Remedial" OR "Exercises, Remedial" OR "Remedial Exercises" OR "Therapy, Exercise" OR "Exercise Therapies" OR "Therapies, Exercise" OR "Rehabilitation Exercise" OR "Exercise, Rehabilitation" OR "Exercises, Rehabilitation" OR "Rehabilitation Exercises") OR TITLE-ABS-KEY (rehabilitation OR habilitation) OR TITLE-ABS-KEY ("Physical Therapy Modalities" OR "Modalities, Physical Therapy" OR "Modality, Physical Therapy" OR "Physical Therapy Modality" OR "Physiotherapy (Techniques)" OR "Physiotherapies (Techniques)" OR "Physical Therapy Techniques" OR "Physical Therapy Technique" OR "Techniques, Physical Therapy" OR "Group Physiotherapy" OR "Group Physiotherapies" OR "Physiotherapies, Group" OR "Physiotherapy, Group" OR "Neurological Physiotherapy" OR "Physiotherapy, Neurological" OR	136	28/08/2020

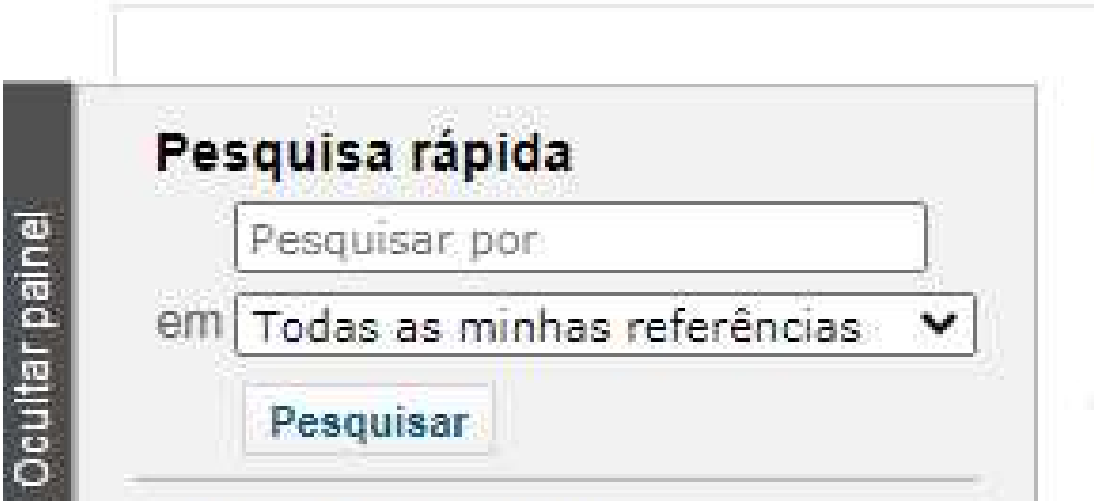
	neurophysiotherapy)) AND (TITLE-ABS-KEY ("Breast Neoplasms" OR "Breast Neoplasm" OR "Neoplasm, Breast" OR "Breast Tumors" OR "Breast Tumor" OR "Tumor, Breast" OR "Tumors, Breast" OR "Neoplasms, Breast" OR "Breast Cancer" OR "Cancer, Breast" OR "Mammary Cancer" OR "Cancer, Mammary" OR "Cancers, Mammary" OR "Mammary Cancers" OR "Malignant Neoplasm of Breast" OR "Breast Malignant Neoplasm" OR "Breast Malignant Neoplasms" OR "Malignant Tumor of Breast" OR "Breast Malignant Tumor" OR "Breast Malignant Tumors" OR "Cancer of Breast" OR "Cancer of the Breast" OR "Mammary Carcinoma, Human" OR "Carcinoma, Human Mammary" OR "Carcinomas, Human Mammary" OR "Human Mammary Carcinomas" OR "Mammary Carcinomas, Human" OR "Human Mammary Carcinoma" OR "Mammary Neoplasms, Human" OR "Human Mammary Neoplasm" OR "Human Mammary Neoplasms" OR "Neoplasm, Human Mammary" OR "Neoplasms, Human Mammary" OR "Mammary Neoplasm, Human" OR "Breast Carcinoma" OR "Breast Carcinomas" OR "Carcinoma, Breast" OR "Carcinomas, Breast")) AND (TITLE-ABS-KEY (mammaplasty OR mammaplasties OR mammoplasty OR mammoplasties OR "Breast Reconstruction" OR "Breast Reconstructions" OR "Reconstruction, Breast" OR "Reconstructions, Breast"))		
WEB OF SCIENCE	TÓPICO: ("Exercise Therapy" OR "Remedial Exercise" OR "Exercise, Remedial" OR "Exercises, Remedial" OR "Remedial Exercises" OR "Therapy, Exercise" OR "Exercise Therapies" OR "Therapies, Exercise" OR "Rehabilitation Exercise" OR "Exercise, Rehabilitation" OR "Exercises, Rehabilitation" OR "Rehabilitation Exercises") OR TÓPICO: (Rehabilitation OR Habilitation) OR TÓPICO: ("Physical Therapy Modalities" OR "Modalities, Physical Therapy" OR "Modality, Physical Therapy" OR "Physical Therapy Modality" OR "Physiotherapy (Techniques) " OR "Physiotherapies (Techniques) " OR "Physical Therapy Techniques" OR "Physical Therapy Technique" OR "Techniques, Physical Therapy" OR "Group Physiotherapy" OR "Group Physiotherapies" OR "Physiotherapies, Group" OR "Physiotherapy, Group" OR "Neurological Physiotherapy" OR "Physiotherapy, Neurological" OR Neurophysiotherapy) Índices=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Tempo estipulado=Todos os anos AND **TÓPICO:** ("Breast Neoplasms" OR "Breast Neoplasm" OR "Neoplasm, Breast" OR "Breast Tumors" OR "Breast Tumor" OR "Tumor, Breast" OR "Tumors, Breast" OR "Neoplasms, Breast" OR "Breast Cancer" OR "Cancer, Breast" OR "Mammary Cancer" OR "Cancer, Mammary" OR "Cancers, Mammary" OR "Mammary Cancers" OR "Malignant Neoplasm of Breast" OR "Breast Malignant Neoplasm" OR "Breast Malignant Neoplasms" OR "Malignant Tumor of Breast" OR "Breast Malignant Tumor" OR "Breast Malignant Tumors" OR "Cancer of Breast" OR "Cancer of the Breast" OR "Mammary Carcinoma, Human" OR "Carcinoma, Human Mammary" OR "Carcinomas, Human Mammary" OR "Human Mammary Carcinomas" OR "Mammary Carcinomas, Human" OR "Human Mammary Carcinoma" OR "Mammary Neoplasms, Human" OR "Human Mammary Neoplasm" OR "Human Mammary Neoplasms" OR "Neoplasm, Human Mammary" OR "Neoplasms, Human Mammary" OR "Mammary Neoplasm, Human" OR "Breast Carcinoma" OR "Breast Carcinomas" OR "Carcinoma, Breast" OR "Carcinomas, Breast") *Índices=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Tempo estipulado=Todos os anos AND TÓPICO: (Mammaplasty OR Mammaplasties OR Mammoplasty OR Mammoplasties OR "Breast Reconstruction" OR "Breast Reconstructions" OR "Reconstruction, Breast" OR "Reconstructions, Breast") Índices=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Tempo estipulado=Todos os anos*	32	28/08/2020

EMBASE	('kinesiotherapy'/exp OR 'kinesiotherapy'/syn OR 'rehabilitation'/exp OR 'rehabilitation'/syn OR 'physiotherapy'/exp OR 'physiotherapy'/syn) AND ('breast tumor'/exp OR 'breast tumor'/syn) AND ('breast reconstruction'/exp OR 'breast reconstruction'/syn)	298	28/08/2020
COCHRANE LIBRARY	MeSH descriptor: [Exercise Therapy] explode all trees OR ("Exercise Therapy" OR "Remedial Exercise" OR "Exercise, Remedial" OR "Exercises, Remedial" OR "Remedial Exercises" OR "Therapy, Exercise" OR "Exercise Therapies" OR "Therapies, Exercise" OR "Rehabilitation Exercise" OR "Exercise, Rehabilitation" OR "Exercises, Rehabilitation" OR "Rehabilitation Exercises"):ti,ab,kw OR MeSH descriptor: [Rehabilitation] explode all trees OR (Rehabilitation OR Habilitation):ti,ab,kw OR MeSH descriptor: [Physical Therapy Modalities] explode all trees OR ("Physical Therapy Modalities" OR "Modalities, Physical Therapy" OR "Modality, Physical Therapy" OR "Physical Therapy Modality" OR "Physiotherapy (Techniques)" OR "Physiotherapies (Techniques)" OR "Physical Therapy Techniques" OR "Physical Therapy Technique" OR "Techniques, Physical Therapy" OR "Group Physiotherapy" OR "Group Physiotherapies" OR "Physiotherapies, Group" OR "Physiotherapy, Group" OR "Neurological Physiotherapy" OR "Physiotherapy, Neurological" OR Neurophysiotherapy):ti,ab,kw AND MeSH descriptor: [Breast Neoplasms] explode all trees OR ("Breast Neoplasms" OR "Breast Neoplasm" OR "Neoplasm, Breast" OR "Breast Tumors" OR "Breast Tumor" OR "Tumor, Breast" OR "Tumors, Breast" OR "Neoplasms, Breast" OR "Breast Cancer" OR "Cancer, Breast" OR "Mammary Cancer" OR "Cancer, Mammary" OR "Cancers, Mammary" OR "Mammary Cancers" OR "Malignant Neoplasm of Breast" OR "Breast Malignant Neoplasm" OR "Breast Malignant Neoplasms" OR "Malignant Tumor of Breast" OR "Breast Malignant Tumor" OR "Breast Malignant Tumors" OR "Cancer of Breast" OR "Cancer of the Breast" OR "Mammary Carcinoma, Human" OR "Carcinoma, Human Mammary" OR "Carcinomas, Human Mammary" OR "Human Mammary Carcinomas" OR "Mammary Carcinomas, Human" OR "Human Mammary Carcinoma" OR "Mammary Neoplasms, Human" OR "Human Mammary Neoplasm" OR "Human Mammary Neoplasms" OR "Neoplasm, Human Mammary" OR "Neoplasms, Human Mammary" OR "Mammary Neoplasm, Human" OR "Breast Carcinoma" OR "Breast Carcinomas" OR "Carcinoma, Breast" OR "Carcinomas, Breast"):ti,ab,kw AND MeSH descriptor: [Mammaplasty] explode all trees OR (Mammaplasty OR Mammaplasties OR Mammoplasty OR Mammoplasties OR "Breast Reconstruction" OR "Breast Reconstructions" OR "Reconstruction, Breast" OR "Reconstructions, Breast"):ti,ab,kw	16	28/08/2020
PEDRO	breast reconstruction physiotherapy (04) breast reconstruction Rehabilitation (01) breast reconstruction Exercise Therapy (04)	04	04/09/2020
CLINICAL TRIALS. GOV	("Exercise Therapy" OR Rehabilitation OR "Physical Therapy Modalities") AND Mammaplasty AND "Breast Neoplasms"	10	04/09/2020
PROQUEST	(("Exercise Therapy" OR "Remedial Exercise" OR "Exercise, Remedial" OR "Exercises, Remedial" OR "Remedial Exercises" OR "Therapy, Exercise" OR "Exercise Therapies" OR "Therapies, Exercise" OR "Rehabilitation Exercise" OR "Exercise, Rehabilitation" OR "Exercises, Rehabilitation" OR "Rehabilitation Exercises") OR (Rehabilitation OR Habilitation) OR ("Physical Therapy Modalities" OR "Modalities, Physical Therapy" OR "Modality, Physical Therapy" OR "Physical Therapy Modality" OR "Physiotherapy (Techniques)" OR "Physiotherapies (Techniques)" OR "Physical Therapy Techniques" OR "Physical Therapy Technique" OR "Techniques, Physical Therapy" OR "Group Physiotherapy" OR "Group Physiotherapies" OR "Physiotherapies, Group" OR "Physiotherapy, Group" OR "Neurological Physiotherapy" OR "Physiotherapy, Neurological" OR Neurophysiotherapy)) AND ("Breast Neoplasms" OR "Breast Neoplasm" OR "Neoplasm, Breast" OR "Breast Tumors" OR "Breast Tumor" OR "Tumor, Breast" OR "Tumors, Breast" OR "Neoplasms, Breast" OR "Breast Cancer" OR "Cancer, Breast" OR "Mammary Cancer" OR	183	04/09/2020

	"Cancer, Mammary" OR "Cancers, Mammary" OR "Mammary Cancers" OR "Malignant Neoplasm of Breast" OR "Breast Malignant Neoplasm" OR "Breast Malignant Neoplasms" OR "Malignant Tumor of Breast" OR "Breast Malignant Tumor" OR "Breast Malignant Tumors" OR "Cancer of Breast" OR "Cancer of the Breast" OR "Mammary Carcinoma, Human" OR "Carcinoma, Human Mammary" OR "Carcinomas, Human Mammary" OR "Human Mammary Carcinomas" OR "Mammary Carcinomas, Human" OR "Human Mammary Carcinoma" OR "Mammary Neoplasms, Human" OR "Human Mammary Neoplasm" OR "Human Mammary Neoplasms" OR "Neoplasm, Human Mammary" OR "Neoplasms, Human Mammary" OR "Mammary Neoplasm, Human" OR "Breast Carcinoma" OR "Breast Carcinomas" OR "Carcinoma, Breast" OR "Carcinomas, Breast") AND (Mammaplasty OR Mammaplasties OR Mammoplasty OR Mammoplasties OR "Breast Reconstruction" OR "Breast Reconstructions" OR "Reconstruction, Breast" OR "Reconstructions, Breast") **Filtros aplicadosOs seus resultados foram filtrados. Vá para os primeiros resultados: breast neoplasms OR physical therapy OR rehabilitation OR mammaplasty**		
Biblioteca Digital Brasileira de Teses e Dissertações (BDTD)	(Todos os campos:"Exercise Therapy" OR "Terapia por Ejercicio" OR "Terapia por Exercício" OR Rehabilitation OR Rehabilitación OR Reabilitação OR "Physical Therapy Modalities" OR "Modalidades de Fisioterapia" OR "Modalidades de Fisioterapia" E Todos os campos:"Breast Neoplasms" OR "Neoplasias de la Mama" OR "Neoplasias da Mama" E Todos os campos:Mammaplasty OR Mamoplastia OR Mamoplastia)	**03**	04/09/2020
TOTAL		**1.189**	
TOTAL DE REFERÊNCIAS EM DUPLICIDADE NO END NOTE WEB	**213 ARTIGOS EXCLUÍDOS POR DUPLICIDADE NO ENDNOTE**	**213**	
TOTAL APÓS EXCLUSÃO DE DUPLICIDADE	**190 ARTIGOS EXCLUÍDOS POR DUPLICIDADE NO RAYYAN**	**190**	
TOTAL DE REFERÊNCIAS EM DUPLICIDADE NO RAYYAN		**786**	

1.176 ARTIGOS ENVIADOS PARA O ENDNOTE

ENDNOTE



213 ARTIGOS EXCLUÍDOS POR DUPLICIDADE NO ENDNOTE

RAYYAN

190 ARTIGOS EXCLUÍDOS POR DUPLICIDADE NO RAYYAN

DESCRITORES TESTADOS E NÃO UTILIZADOS NA ESTRATÉGIA FINAL

Descritor *Inglês*:	**Postoperative Care**
Descritor *Espanhol*:	**Cuidados Posoperatorios**
Descritor *Português*:	**Cuidados Pós-Operatórios**
Sinônimos *Português*:	Assistência Pós-Operatória Assistência na Fase Pós-Operatória Assistência no Período Pós-Operatório
Categoria:	E02.760.731.700 E04.604.500 N02.421.585.722.700
Definição *Português*:	Período de cuidados que se inicia quando o paciente é removido da cirurgia, e que visa satisfazer as necessidades psicológicas e físicas do paciente logo após uma cirurgia.

MESH	**"Postoperative Care" OR "Care, Postoperative" OR "Postoperative Procedures" OR "Postoperative Procedure" OR "Procedure, Postoperative" OR "Procedures, Postoperative"**

Descritor *Inglês*:	**Exercise**

Descritor *Espanhol*:	**Ejercicio Físico**
Descritor *Português*:	**Exercício Físico**
Sinônimos *Português*:	Atividade Física para Idoso Exercício Exercício Aeróbico Exercício Agudo Exercício Isométrico Treinamento Físico
Categoria:	G11.427.410.698.277 I03.350
Definição *Português*:	Atividade física geralmente regular e feita com a intenção de melhorar ou manter a APTIDÃO FÍSICA ou a SAÚDE. É diferente de ESFORÇO FÍSICO que é voltado principalmente para as respostas fisiológicas e metabólicas ao uso da energia.

Exercise OR "Ejercicio Físico" OR "Exercício Físico"

MESH	**Exercise OR Exercises OR "Physical Activity" OR "Activities, Physical" OR "Activity, Physical" OR "Physical Activities" OR "Exercise, Physical" OR "Exercises, Physical" OR "Physical Exercise" OR "Physical Exercises" OR "Acute Exercise" OR "Acute Exercises" OR "Exercise, Acute" OR "Exercises, Acute" OR "Exercise, Isometric" OR "Exercises, Isometric" OR "Isometric Exercises" OR "Isometric Exercise" OR "Exercise, Aerobic" OR "Aerobic Exercise" OR "Aerobic Exercises" OR "Exercises, Aerobic" OR "Exercise Training" OR "Exercise Trainings" OR "Training, Exercise" OR "Trainings, Exercise"**

Descritor *Inglês*:	**Range of Motion, Articular**
Descritor *Espanhol*:	**Rango del Movimiento Articular**
Descritor *Português*:	**Amplitude de Movimento Articular**
Sinônimos *Português*:	Amplitude Passiva de Movimento
Categoria:	E01.370.600.700 G11.427.760
Definição *Português*:	A distância e direção para qual uma articulação óssea pode ser estendida. A amplitude de movimento é uma função da condição das articulações, músculos e tecidos conjuntivos envolvidos. A flexibilidade da articulação pode ser melhorada através de EXERCÍCIOS DE ALONGAMENTO MUSCULAR apropriados.

"Range of Motion, Articular" OR "Rango del Movimiento Articular" OR "Amplitude de Movimento Articular"

MESH	**"Range of Motion, Articular" OR "Joint Range of Motion" OR "Joint Flexibility" OR "Flexibility, Joint" OR "Range of Motion" OR "Passive Range of Motion"**

Descritor *Inglês*:	**Upper Extremity**
Descritor *Espanhol*:	**Extremidad Superior**
Descritor *Português*:	**Extremidade Superior**
Sinônimos *Português*:	Extremidades Superiores Membro Superior Membro Torácico Membros Superiores Membros Torácicos Região da Extremidade Superior
Categoria:	A01.378.800
Definição *Português*:	Região do membro superior nos animais que se estende da região deltoide até a MÃO, incluindo o BRAÇO, AXILA e o OMBRO.

"Upper Extremity" OR "Extremidad Superior" OR "Extremidade Superior"

MESH	"Upper Extremity" OR "Extremities, Upper" OR "Upper Extremities" OR "Membrum superius" OR "Upper Limb" OR "Limb, Upper" OR "Limbs, Upper" OR "Upper Limbs" OR "Extremity, Upper"

Descritor *Inglês*:	**Mastectomy**
Descritor *Espanhol*:	**Mastectomía**
Descritor *Português*:	**Mastectomia**
Categoria:	E04.466
Definição *Português*:	Procedimento cirúrgico para remover uma ou ambas as mamas (humanas).

Mastectomy OR Mastectomía OR Mastectomia

MESH	Mastectomy OR Mastectomies OR Mammectomy OR Mammectomies

Descritor *Inglês*:	**Breast Implantation**
Descritor *Espanhol*:	**Implantación de Mama**
Descritor *Português*:	**Implante Mamário**
Sinônimos *Português*:	Implantação Mamária Implantação de Mama Implantação de Prótese Mamária Implantação de Prótese de Mama Implante de Mama Implante de Prótese Mamária Implante de Prótese de Mama
Categoria:	E02.218.565.210 E04.650.210 E04.680.500.210
Definição *Português*:	Inserção cirúrgica de uma bolsa inerte cheia de silicone ou outro material para aumentar cosmeticamente as formas femininas.
Relacionados *Português*:	Implantes de Mama

"Breast Implantation" OR "Implantación de Mama" OR "Implante Mamário"

MESH	"Breast Implantation" OR "Breast Implantations" OR "Implantation, Breast" OR "Implantations, Breast" OR "Breast Prosthesis Implantation" OR "Breast Prosthesis Implantations" OR "Implantation, Breast Prosthesis" OR "Implantations, Breast Prosthesis" OR "Prosthesis Implantation, Breast" OR "Prosthesis Implantations, Breast"

APÊNDICE 2: Artigo retrospectivo

Clinical outcomes of a rehabilitation programme following immediate breast reconstruction: A retrospective cohort study

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The author states that they do not have conflict of interests.

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ABSTRACT

Background: Rehabilitation after breast reconstruction may help patients restore their upper quadrant function but there are still concerns over an increase in the risk of scar and vascular-related complications. **Objective:** To assess the effect of rehabilitation on shoulder range of motion and complications for women who underwent immediate breast reconstruction. To explore the complications postoperatively in women undergoing rehabilitation through exercises after immediate breast reconstruction for breast cancer. **Method:** We analysed data from 145 women who underwent rehabilitation following immediate breast reconstruction between 2010 and 2019. Following surgical discharge, patients started a rehabilitation programme consisting of care guidelines for upper limbs and for daily activities and group or individual exercise sessions. The rehabilitation programme lasted four to eight weeks. The outcomes were scar and vascular-related complications and shoulder range of motion. **Results:** Patients' mean age was 48.7 (SD=10.9) years old. The mean time between surgery and first rehabilitation session was 38.32 (SD=23.2) days and the mean number of face-to-face sessions was 6.1 (SD=2.3) days. The most common complication was scar adherence (20.6%). Shoulder range of motion restrictions were associated with type of reconstruction (autologous tissue+implant), scar adherence, dehiscence and axillary web syndrome (p=0.011; p=0.017; p=0.025, respectively). **Conclusion:** Rehabilitation following breast reconstruction did not increase the risk of complications. Restrictions to shoulder range of motion were associated with scar adherence, axillary web syndrome and breast reconstruction using a combination of implants and autologous tissue.

Keywords: physiotherapy, breast cancer, breast reconstruction, mammaplasty

APÊNDICE 3: Proposta de protocolo para ensaio clínico randomizado

EFEITOS FUNCIONAIS DA FISIOTERAPIA NO PÓS-OPERATÓRIO PRECOCE DE RECONSTRUÇÃO MAMÁRIA IMEDIATA POR CÂNCER DE MAMA: ENSAIO CLÍNICO RANDOMIZADO

Introdução: A reconstrução mamária é uma parte valiosa do tratamento do câncer de mama, contribuindo para a melhora da imagem corporal e qualidade de vida das mulheres. No entanto, não está isenta de sequelas, como distúrbios cicatriciais, edema, dor, restrição da amplitude de movimento de ombro e alterações biomecânicas. A fisioterapia pode colaborar na prevenção e melhora de complicações relacionadas à reconstrução mamária. Porém, ainda não há consenso na literatura científica sobre qual o momento ideal para iniciar esta prática e qual a melhor técnica a ser utilizada. Os exercícios ativos já demonstram ser seguros e eficazes. A terapia manual também parece ser uma técnica promissora. Objetivo: Avaliar os efeitos funcionais da fisioterapia com início precoce e tardio no pós-operatório de mulheres submetidas à reconstrução mamária imediata por câncer de mama, comparando exercícios domiciliares isolados e associados ao uso de terapia manual. Sujeitos e Métodos: Ensaio clínico randomizado. Serão avaliadas 180 mulheres, entre 18 e 70 anos, submetidas à cirurgia de reconstrução mamária imediata por câncer de mama realizadas no Hospital da Mulher Prof. Dr. José Aristodemo Pinotti / CAISM – UNICAMP e no Hospital do Câncer III / INCA, que sejam acompanhadas nestes mesmos hospitais. As que aceitarem e forem incluídas serão randomizadas em 4 grupos: grupo de exercícios domiciliares iniciados com 15 ou 30 dias de pó-operatório e grupo de exercícios domiciliares associados à terapia manual, também iniciados com 15 ou 30 dias de pós-operatório. Os dados sociodemográficos, clínicos e a avaliação física serão coletados na avaliação pré-operatória; as reavaliações serão feitas com 15, 30 e 60 dias após a cirurgia. Serão avaliadas alterações cicatriciais, inchaço dos membros superiores, dor pós-operatória, amplitude de movimento do ombro, força muscular de membros superiores, funcionalidade de membros superiores e qualidade de vida. Análise dos Dados: Os dados serão descritos através de frequências, absolutas e relativas, e através de média, mediana e desvio-padrão. Os dados serão descritos através de frequências, absolutas e relativas, e através de média, mediana e desvio-padrão. A comparação das médias de amplitude de movimento, escala de dor e força muscular será realizada através de Análise de Variâncias (ANOVA) ou pelo teste de Kruskal-Wallis, conforme aplicáveis. O nível de significância assumido no trabalho é de 5%. Palavras-chave: câncer de mama, reconstrução mamária, modalidade de fisioterapia, exercícios, terapia manual.

9. ANEXOS

ANEXO 1: Registro no *International prospective register of systematic review* (PROSPERO)

PROSPERO
International prospective register of systematic reviews

< Back

Dear Dr Sunemi,

Thank you for submitting details of your systematic review "Physiotherapy and exercise following breast reconstruction in breast cancer patient: systematic review and intervention development" to the PROSPERO register. We are pleased to confirm that the record will be published on our website within the next hour.

Your registration number is: CRD42020192762

You are free to update the record at any time, all submitted changes will be displayed as the latest version with previous versions available to public view. Please also give brief details of the key changes in the Revision notes facility and remember to update your record when your review is published. You can log in to PROSPERO and access your records at https://www.crd.york.ac.uk/PROSPERO.

Comments and feedback on your experience of registering with PROSPERO are welcome at crd-register@york.ac.uk

Best wishes for the successful completion of your review.

Yours sincerely,

Susan Sutton
PROSPERO Administrator
Centre for Reviews and Dissemination
University of York
York YO10 5DD
t: +44 (0) 1904 321049
e: CRD-register@york.ac.uk
www.york.ac.uk/inst/crd

PROSPERO is funded by the National Institute for Health Research and produced by CRD, which is an academic department of the University of York.

Email disclaimer: https://www.york.ac.uk/docs/disclaimer/email.htm

Other non-commercial resources that may be of interest
SRDR-Plus is a systematic review data management and archival tool that is available free of charge http://srdrplus.ahrq.gov.

Systematic review

*Fields that have an **asterisk (*)** next to them means that they **must be answered.** **Word limits** are provided for each section. You will be unable to submit the form if the word limits are exceeded for any section. Registrant means the person filling out the form.*

3. * Anticipated or actual start date.

Give the date the systematic review started or is expected to start.

01/07/2020

4. * Anticipated completion date.

Give the date by which the review is expected to be completed.

31/01/2023

5. * Stage of review at time of this submission.

This field uses answers to initial screening questions. It cannot be edited until after registration.

Tick the boxes to show which review tasks have been started and which have been completed.

Update this field each time any amendments are made to a published record.

The review has not yet started: No

Review stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	Yes	Yes
Data extraction	Yes	Yes
Risk of bias (quality) assessment	Yes	Yes
Data analysis	Yes	Yes

Provide any other relevant information about the stage of the review here.

Protocol not yet finalised
Protocol not yet finalised

11. * Review team members and their organisational affiliations.

Give the personal details and the organisational affiliations of each member of the review team. Affiliation refers to groups or organisations to which review team members belong.
NOTE: email and country now MUST be entered for each person, unless you are amending a published record.

Dr Mariana Sunemi. University of Campinas
Dr Barbara Sarmento. University of Campinas
Dr Bruno Mazuquin. University of Warwick

Julie Bruce. University of Warwick

Dr Marcela Ponzio Pinto e Silva. University of Campinas

14. Collaborators.

Give the name and affiliation of any individuals or organisations who are working on the review but who are not listed as review team members. **NOTE: email and country must be completed for each person, unless you are amending a published record.**

34. Reference and/or URL for published protocol.

If the protocol for this review is published provide details (authors, title and journal details, preferably in Vancouver format)

No I do not make this file publicly available until the review is complete

37. Details of any existing review of the same topic by the same authors.

If you are registering an update of an existing review give details of the earlier versions and include a full bibliographic reference, if available.

38. * Current review status.

Update review status when the review is completed and when it is published.
New registrations must be ongoing so this field is not editable for initial submission.

Review_Ongoing

40. Details of final report/publication(s) or preprints if available.

Leave empty until publication details are available OR you have a link to a preprint (NOTE: this field is not editable for initial submission).
List authors, title and journal details preferably in Vancouver format.

ANEXO 2: Comprovante de submissão do artigo

THEBREAST-D-22-591 - Confirming your submission to The Breast

The Breast <em@editorialmanager.com>
Qui, 27/10/2022 16:38

Para: Barbara Vaz Sarmento <barbarav.sarmento@hotmail.com>

Dear Physiotherapist Vaz Sarmento,

Your submission entitled "Effects of post-operative physical therapy after breast reconstruction for breast cancer: systematic review and meta-analysis." (Review Article) has been received by the Editorial Office of The Breast. It has been assigned the following manuscript number: THEBREAST-D22-591.

You will receive notification of the reference number once an editor has been assigned.

Please note that as of 1 Octboer 2019 The Breast is full Open access and authors need to cover publication fees upon acceptance of their manuscript.

Thank you for submitting your manuscript to The Breast.

Yours sincerely,

Editor
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Office
The
Breast

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