

**Therapeutic Approaches Used as a Tool for Functional and Aesthetic Restoration in Plastic Surgery Post-Operative Phase: A Literature Review**

**Abordagens terapêuticas utilizadas como ferramenta para restauração funcional e estética no pós-operatório de cirurgia plástica: uma revisão da literatura**

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**ABSTRACT**

The dermato-functional physiotherapist can prepare patients for cosmetic surgery, aiming at reducing the occurrence of tissue complications during and after the procedure. Several techniques are used by physiotherapy, such as therapeutic ultrasound (TUS), manual lymphatic drainage (MLD), electrothermophototherapy, therapeutic kinesiotaping. The aim of this study was, through a literature review of the last 21 years, to verify which are the therapeutic, dermo-functional approaches used as a functional and aesthetic reestablishment tool in the postoperative plastic surgery. The main results showed that for the treatment of fibrosis, 100% of the authors used MLD, for edema, there was association of MLD with: microcurrent, LED, taping, TUS, and cryotherapy. In the treatment of pain, MLD was effective in 100% of articles, and in 33% there was an association of MLD with TUS. In the treatment for capsular contracture the TUS was used. Improvement of scar appearance was possible by applying fractional CO<sub>2</sub> laser. It is concluded that MLD was the most used method among the studies, showing the wide efficacy of the technique. In addition to therapeutic ultrasound, which has been widely used for the treatment of edema, pain, and fibrosis to the treatment of capsular contracture.

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**Keywords:** Postoperative. Abdominoplasty. Liposuction. Manual Lymphatic Drainage.

### RESUMO

O fisioterapeuta dermato-funcional pode preparar o paciente para a cirurgia estética, com o objetivo de reduzir a ocorrência de complicações teciduais durante e após o procedimento. Diversas técnicas são utilizadas pela fisioterapia, como ultrassom terapêutico (UST), drenagem linfática manual (DLM), eletrotermofototerapia, cinesiotapagem terapêutica. O objetivo deste estudo foi, por meio de uma revisão da literatura dos últimos 21 anos, verificar quais as abordagens terapêuticas dermofuncionais utilizadas como ferramenta de restabelecimento funcional e estético no pós-operatório de cirurgia plástica. Os principais resultados mostraram que para o tratamento da fibrose, 100% dos autores utilizaram DLM, para edema, houve associação de DLM com: microcorrente, LED, bandagem, UST e crioterapia. No tratamento da dor, o DLM foi eficaz em 100% dos artigos e em 33% houve associação do DLM com a UST. No tratamento da contratura capsular foi utilizado o UST. A melhora da aparência da cicatriz foi possível com a aplicação do laser de CO<sub>2</sub> fracionado. Conclui-se que a DLM foi o método mais utilizado entre os estudos, mostrando a ampla eficácia da técnica. Além do ultrassom terapêutico, que tem sido amplamente utilizado para o tratamento de edema, dor e fibrose ao tratamento da contratura capsular.

**Palavras-chave:** Pós-operatório. Abdominoplastia. Lipoaspiração. Drenagem Linfática Manual.

### 1 INTRODUCTION

The aesthetic standard imposed by the media has a direct influence on the self-image and self-esteem of the individual, because of this, the demand for plastic surgery has grown over the years<sup>1</sup>. The concept of health of complete physical, mental, and social well-being and not only the absence of disease, allows to include self-esteem as a psychic character and when altered, demonstrates a disease<sup>2</sup>.

According to the International Society of Aesthetic Plastic Surgery (ISAPS), Brazil is the second country that performs the most surgeries, the most frequent

being breast augmentation (15.8%), liposuction (14%), blepharoplasty (12.9%), rhinoplasty (7.6%) and abdominoplasty (7.4%)<sup>3</sup>.

Surgical intervention consists of tissue aggression that can alter tissue functionality, so successful surgery requires specific postoperative procedures to reduce the possible consequences of the procedure. Dermato-functional physiotherapy is of remarkable importance in the surgical segment using several resources to accelerate the postoperative recovery process and decrease recurrent changes<sup>2</sup>.

Postoperative physical therapy treatment allows for the improvement and prevention of complications such as edema, seroma, bruising, pain, tissue fibrosis, scar, and tissue adherence, allowing the patient to return to his daily activities more quickly<sup>4,5</sup>.

Manual (MLD) or mechanical (MEDL) lymphatic drainage is a technique for the application of light, slow and superficial maneuvers with pressure of 20 to 45 mmHg, applied towards the lymphatic system, optimizing its functions through the extravasation of proteins. will be reabsorbed. The technique aims to reduce edema and venous circulatory disorders, also favoring pain due to decompression<sup>1,6</sup>.

Therapeutic ultrasound (TUS) of 3MHz is used since the early postoperative phase, acting in the inflammatory phase, and favoring tissue nutrition, improving lymphatic and blood circulation, reducing pain and local edema. When used early, TUS reduces the formation of tissue fibrosis and prevents its progress<sup>1</sup>. In addition, it has been used for prevention and treatment of complications such as breast prosthesis capsular contracture. Among its benefits are improved blood flow, increased oxygenation and control in the release of chemical mediators of inflammation<sup>7,8</sup>.

Another resource being used by professionals is lymphotaping through therapeutic bandaging. The therapeutic bandage is a technique of Kenso Kase, which uses an elastic, porous and adhesive colonic tape for physiological effects such as analgesia, muscle support and joint correction. The tape can be cut according to the purpose of using the technique and for the purpose of lymphatic drainage (linfotaping) the fan cut is used, being applied following the path of the lymphatic system, providing better lymph flow<sup>1</sup>.

For pain and edema reduction cryotherapy and endermotherapy are widely used<sup>5,9</sup>. Ice pack cryotherapy is a common technique that promotes application site cooling, leading to vasoconstriction and consequently reducing pain and edema<sup>5</sup>. Endermotherapy by appliance is also used postoperatively, acting by fibrotic disaggregation, and promoting a more uniform and non-adherent tissue<sup>9</sup>.

For the treatment of scars, the use of fractional CO<sub>2</sub> laser and topical use of silicone gel have been mentioned for treatment from the early stage of the scar, aiming to promote scar and aesthetic quality through tissue narrowing and collagen remodeling<sup>10,11,12</sup>.

Given the available resources and techniques, it is necessary to survey the most commonly used postoperatively to provide patients with the most effective treatment, favoring the success of surgery.

The aim of this study was, through a literature review to verify which are the therapeutic approaches used as a functional and aesthetic reestablishment tool in the postoperative plastic surgery.

## **2 METHODS**

A literature review was conducted through articles published from 1997 to 2018 indexed in the Center-Latin American and Caribbean Health Sciences Information database (Bireme), using the keywords: Plastic Surgery, Post Postoperative, Abdominoplasty, Liposuction, Scar (Cicatrix / Scar), Mammoplasty, Manual Lymphatic Drainage, Physical Therapy Modalities, Breast Implantation, Breast Implantation, Ultrasound, Capsular Contracture, Fibrosis, Laser, in the Portuguese and English languages.

Inclusion criteria were complete articles, language, articles related to the techniques used in the postoperative treatment of plastic surgery, as well as the performance of the physical therapist, who met the descriptors. Exclusion criteria were articles that presented only the abstract, articles related to the postoperative period, but not reconstructive plastic surgery or related to the cancerous process, and articles that did not meet the descriptors and languages.

## **3 RESULTS**

**Table 1.** Listed eligible articles

Author/ Year	Type of Studies	Characteristics of the Sample	Main Analyzed Variables	Types of Intervention	Significative Results
Anny Chi et al (2016)	Clinical Trial	10 women between 44 and 51 years old, who underwent abdominoplasty, abdominal liposuction, with or without restriction, with at least 7 days of PO, in the proliferative or remodeling phase	Evaluation of tissue fibrosis by palpation and contact thermography before and after the intervention.	10 physical therapy activities lasting 90 minutes each, twice a week, at intervals of 2 or 3 days, two groups divided into: Proliferation Phase (7 days PO): MLD Leduc all over the body and Fan-shaped lymphotaping. Remodeling Phase (20 days postoperative): MLD and combined therapy lymphage Fan (US = three 3 MHz ultrasound generators with effective area of 6 cm <sup>2</sup> and total power = 54W and Aussie current) in the abdominal region. The protocol used for pre-programmed in the device as late PO (continuous mode, 1 KHz carrier frequency, frequency = 50Hz and maximum patient tolerated intensity).	100% of patients in the proliferative group had level 1 reduction at level 0, while 80% of the remodeling group reduced level 3 to 1 and 20% from level 3 to 2.
Anny Chi et al (2018)	Clinical Trial	20 women between 18 and 56 years old who underwent abdominoplasty or abdominal liposuction, with or without abdominoplasty and who were less than 7 days preoperative. CG: 10. EG: 10.	Both groups were subjected to preoperative and daily from the 4th postoperative day until the end of their procedures. Evaluation of tissue fibrosis formation by palpation and visual appearance, contact thermography and photography. Analysis of edema by perimeter and body weight. Analysis of bruises by photography.	CG: treatment started on the 4th day of the PO with 1-hour projects, with the first three sequential sessions and the other alternatives, totaling 15 sessions. Leduc MLD application; microcurrent; Red LED and recording application in the operated area. EG: preoperative: guidance on PO care, nutritional guidance and indication of oral antibiotics and topical antibiotics, for 30 days or until the end of the product. Transoperative: adhesive tape applied to the abdomen and flanks; application of 360° containment foam in the region operated under surgical mesh. PO: same as CG.	The perimetry before, during and after the treatment allowed to observe that the EG presented the greatest reduction of CG perimeters. The EG presented lower mean resolution of fibrosis and bruise than the CG. However, a non-intense occurrence of fibrosis, edema and equal intensities was higher in the EG group than in the CG.

Igor F. B. Masson et al (2014)	Clinical Trial	<p>18 women between 18 and 60 years without liposuction in the abdomen, flanks and lower trunk or lipoabdominoplasty, with tissue fibrosis in the flank and abdomen. All having made continuous use of elastic compression clothing for 3 months in the PO.</p> <p>LG = 10 patients LAG = 8 patients</p>	<p>IA: pre-intervention evaluation. EDI: evaluation during intervention (after a 6th session). FE: final evaluation (after 12th session). Assessment of fibrosis grade by fibrosis level assessment protocol. Both as tests performed by an examiner who did not participate in the survey.</p>	<p>12 physical therapy sessions, 3 times a week for approximately 40 minutes each, with one app followed by MLD in the US. US application: SP patient on the stretcher, US Sonopulse model III Sapphire with 3 MHz frequency, continuous mode, intensity 0.8 W / cm<sup>2</sup>, power 2.8 W, direct skin contact and calculated application time for each patient according to the size of the area. After the use of Leduc MLD in the USA, upper and lower abdomen, lower trunk and flanks.</p>	<p>So that the amount of pain in LG has significantly decreased between IA and FE with greater significance between EDI and FE, while LGA has decreased significantly only between IA and FE, with no pain in FE.</p> <p>Regarding edema in LG there was a significant decrease in IA for FE and also for EDI for FE, while in LGA there was a significant decrease in IA for EDI and FE. However, both groups have edema in PA.</p> <p>Regarding tissue fibrosis, 100% of participants reported fibrosis in IA and LG, there was little difference from IA to FA and EDI to FE. In LGA there was significant reduction only from IA to FE. Both groups still contain fibrosis in FE, but to a lesser extent (LG = 3 and LGA = 5)</p>
Mariana de Moraes Coutinho et al (2006)	Clinical Trial	<p>12 women who underwent abdominoplasty associated with flank liposuction.</p> <p>G1 = 6 early patients undergoing physical therapy treatment between the 7th and 9th postoperative days. G2: 6 patients who underwent late physical therapy treatment between the 42nd and 69th postoperative days.</p>	<p>Physical examination with waist circumference pre and post intervention.</p>	<p>Patients underwent 1h20 attendance, three times a week, 20 sessions in total. Protocol G1: cryotherapy in the flank areas for 20 min. US 3MHz; 0.5 W / cm<sup>2</sup> for 10 min. in the surgical scar (closed); MLD in the abdomen, back and lower limbs, done in SP and LD for 50 min. G2 protocol: US 3MHz; 0.5w / cm<sup>2</sup> for 10 min. in the surgical scar; pulsed espresso with pulse of 25 minutes 05 minutes on each flank and continuous espresso with patient-tolerable pressure (between 100 and 200 mmHg) for 05 minutes on each flank. Classic massage for 10 min. on the flanks and abdomen; MLD without abdomen, back and lower limbs for 40 min. in SP and PP.</p>	<p>Both groups presented edema reduction after an intervention, however G1 showed significantly larger reductions compared to G2.</p>

Lucia Maria Alves Soares et al (2005)	Randomized Clinical Trial	14 women between 35 and 50 years old who underwent abdominoplasty and were between the 8th and 26th postoperative day, all with edema, bruising, pain and paraesthesia. CG = 7 IG = 7	Anamnesis, physical examination, perimeter measurements were performed at the time of admission to the study and at the end of 10 days of intervention. And a questionnaire was applied to the patient and the physiotherapist to assess the level of satisfaction of the results obtained after both treatment modalities.	CG: submitted to MLD. IG: submitted to MEDL. Both techniques performed in 10 sessions, 3 times a week and for 40 minutes each session.	Both techniques brought symptom reduction, but MLD was more effective compared to pre- and post-intervention evaluation.
Jorge Planas et al (1997)	Clinical Trial	24 women between 24 and 52 years old with unilateral or bilateral capsular contracture.	14 bilateral and 10 unilateral contractures that were classified in degrees by the Baker scale: Grade II: 1 contracture Grade III: 22 Contractures Grade IV: 11 contractures. The scale classifies as grade I the breast that has consistency similar to a natural breast; grade II when the breast is more rigid and the prosthesis palpable, with minimal contracture; grade III when there is a medium contracture with hardening and palpable and visible prosthesis; grade IV when there is severe contracture with tightness and contortion of the breast, with pain.	The patients underwent a bra fitted with an 8-transducer ultrasonic device (4 in each breast) with a maximum power of 3W / cm <sup>2</sup> and which were directed to the fibrotic and contracture region. The transducers were programmed in continuous or pulsed mode and at 15 watts of power with emission cycles defined according to the degree of contracture. There were 2 sessions per week and the number of weeks was defined from the results of each session.	Follow-up was around 12 months and the patients reported subjective softening of the breast tissue, while on the Baker scale there was a reduction in contractures: Grade II (1) reduced 100% to grade I. Grade III (22) reduced 86.36% to grade I, 9.09% to grade II, and 4.54% remained in grade III. Grade IV (11) reduced 72.72% to grade I, 9.09% to grade II and 18.18% to grade III.

Feiya Du et al (2018)	Clinical Trial	10 patients between 22 and 47 years old with scarring without history of keloid formation, without frequent and prolonged exposure to the sun and without having undergone isotretinoin use at 6 months.	Type IV skin on the Fitzpatrick scale. Scale is a numerical classification for skin color and how it reacts in contact with the sun; therefore, Type I is pale white skin that burns easily and does not tan; type II is white skin that burns easily and tan with difficulty; Type II is white skin that may burn initially but easily tan; Type IV is light brown skin that hardly burns and easily tans; type V is brown skin that usually does not burn and tan easily and type VI is black skin that does not burn and darkens after sun exposure. 10 patients between 22 and 47 years old with scars with no history of keloid formation, no frequent and prolonged sun exposure and no use of isotretinoin at 6 months.	Sutures were performed to reduce the tension and align the wound and afterwards, fractional CO <sub>2</sub> laser was applied to the scar in two steps with different parameters. First laser was applied in deep mode 20–22.5 mJ, with a density of 5% and then in a superficial mode 80–100 mJ, with a density of 40%. After application the wound was closed using a non-absorbable suture, which was removed after 1 week. The patients were followed for 6 months. One of the patients had a deep traumatic scar on her face and underwent Z scar reduction surgery, followed by the application of a 22.5 mJ deep mode fractional CO <sub>2</sub> laser and a 80 mJ superficial mode density laser. 40%). The wound was closed and the stitches removed after 1 week. The patient was followed for 8 months.	Comparing the images before and after the procedure allowed to observe the improvement of the scar of all patients. Erythema resolved within 3 months in all patients and there were no cases of permanent hyperpigmentation, hypopigmentation or scar hyperplasia.
Luiz Ronaldo Alberti et al (All patients had reduced edema and pain at the liposuction site.2017)	Randomized Clinical Trial	Forty-two women between 18 and 60 years old who had a scar resulting from plastic surgery were equally divided into CG and TG by lot.	Fitzpatrick skin type classification (between I and IV). Patients from both groups returned at month 2 and 6 for image collection and macroscopic scar analysis by 2 different examiners using the Vancouver scale.	CG: use of silicone gel (PrevKel) around the 3rd week of PO. Method of application: Apply the gel gently over the scar, spreading so that it covers the entire scar and some of its adjacent region. Use by month 6 every 12 hours. TG: application of fractional CO <sub>2</sub> laser on the scar from the end of the 3rd week of postoperative. Patients were instructed to use a thick layer of anesthetic cream on the scar for 1 hour before the procedure and to cover with film paper. Some patients required the use of 1% lidocaine infiltrative anesthesia with vasoconstrictor. Laser parameters: 20% density and 10 mJ energy, a 03mm scanner and 0.3 second pulse repetition time. One scan per session was performed. Soon after the procedure the treated area was covered with silicone spray (Kelo-Cote). In addition, the patient used silicone gel (PrevKel) every 12 hours until the 6th month.	One TG patient lost follow-up after the 2nd week of PO, so n = 41. According to the evaluation of both evaluators from the Vancouver scale, the use of silicone proved to be less beneficial compared to the use of fractional CO <sub>2</sub> laser associated with the use of silicone.



Mariana Marcelo Ceolin (2006)	Clinical Trial	3 women between 20 and 30 years old, in immediate postoperative liposuction in the abdomen.	Abdomen cytometry, VAS, palpation for detection of edema (locker signal present throughout the abdomen in both patients) and fibrosis (no patient had fibrosis). This evaluation was performed before and after the intervention.	MLD application in 15 sessions of 50 minutes 3x / week.	All patients had reduced edema and pain at the liposuction site.
Sue-Min Kim et al (2014)	Randomize d Clinical Trial	25 pacientes em PO de 2 semanas à 3 meses, sendo 9 homens e 16 mulheres com média de 37,52 anos divididos aleatoriamente em G1= 11 (tratamento folha de silicone) e G2=14 (tratamento gel de silicone).	25 patients in PO from 2 weeks to 3 months, 9 men and 16 women with an average of 37.52 years randomly divided into G1 = 11 (silicone sheet treatment) and G2 = 14 (silicone gel treatment).	G1 = treatment with sheet silicone gel (ScarclinicTM-Thin) and G2 = treatment with topical silicone gel (Kelo-Cote), both for 3 months.	Both groups showed improvement in pigmentation, irregularity and size.

Caption: US: ultrasound; PO: postoperative; MLD: manual lymphatic drainage; MEDL: mechanical lymphatic drainage; CG: control group; IG: intervention group; EG: experimental group; TG: treatment group; G1: group 1; G2: group 2; LL: Lower limbs; UL: Upper limbs; SP: supine position; LD: lateral decubitus; PP: prone position; S1: subgroup 1; S2: subgroup 2; S3: subgroup 3; LG = liposuction group; LGA = lipoabdominoplasty group; IA: initial assessment; EDI: evaluation during intervention; FE: final evaluation.

## 4 DISCUSSION

The study was conducted only with articles that brought clinical trials and randomized controlled trials. Clinical trials consist of studies conducted with humans, pre-approved by the Ethics Committee, which seek to find out the results of the application of techniques in the participant's health, in order to enrich the clinical practice. The difference between a common clinical trial and a randomized clinical trial is that in the former the participants are divided for application of the technique in the way the author prefers, as well as the evaluation of the results, which is made by the authors who participated in the intervention. In the second, the division of participants for each technique is done randomly and the evaluation of results is made by examiners who did not participate in the intervention. Consequently, the randomized clinical trial becomes safer by preventing interference with results<sup>15</sup>.

The average number of patients approached by the trials was 17.8 with a mean age of 37 years, with 80% of the articles composed only by women and 20% by men and women. The surgeries performed were 60% liposuction and abdominoplasty, associated or not, 10% breast prosthesis and 40% surgeries or lesions with scars to be treated<sup>1,3-6,8,10,11,13,14</sup>.

Regarding the most used preoperative techniques, about 10% of the authors used topical or oral anti-glucant nutricosmetics, while the others did not apply any technique in the pre-surgery phase. Postoperatively about 60% of the authors performed MLD, 40% TUS, 20% lymphotaping, 20% fractionated CO<sub>2</sub> laser, 20% silicone gel, 10% silicone tape, 10% cryotherapy, 10% classic massage, 10%. MEDL associated or not<sup>1,3-6,8,10,11,13,14</sup>.

For the treatment of tissue fibrosis, Anny Chi et al (2016)<sup>1</sup> performed 10 physiotherapeutic visits lasting 90 minutes each, twice a week at intervals of 2 to 3 days. Group 2, which presented the best results, underwent the whole-body Leduc MLD method, Fan method lymphotaping and the combined therapy in the abdominal region (TUS and Aussie current)<sup>1</sup>. Subsequently Anny Chi et al (2018)<sup>3</sup> conducted a study like the above, where 20 women with an average age of 37 years were included in the study. The CG had its treatment started on the 4th postoperative day with duration of 1 hour each service, being the first three sessions in a row, and the

remaining alternating, totaling 15 sessions. Leduc MLD method was used, microcurrent (frequency: 250Hz, intensity: 150 $\mu$ A) for 20 minutes in the abdominal region, red LED (650-959 nm) for 20 minutes in the abdominal region and taping the abdomen with the necessary cut for the type of involvement found in each patient. The CG increased fibrosis<sup>3</sup>. In the study by Igor F. B. Masson et al (2014)<sup>4</sup> 18 women with a mean age of 33.6 years who underwent liposuction in the abdomen, flanks and lower trunk or lipoabdominoplasty, with flank and abdomen tissue fibrosis were submitted to treatment. Twelve physical therapy sessions were performed 3 times a week for 40 minutes each, with the application of the TUS and MLD Leduc method on the abdomen and flanks<sup>4</sup>. For the treatment of fibrosis, 100% of the authors used MLD in common, highlighting the importance of the technique<sup>1,3,4</sup>.

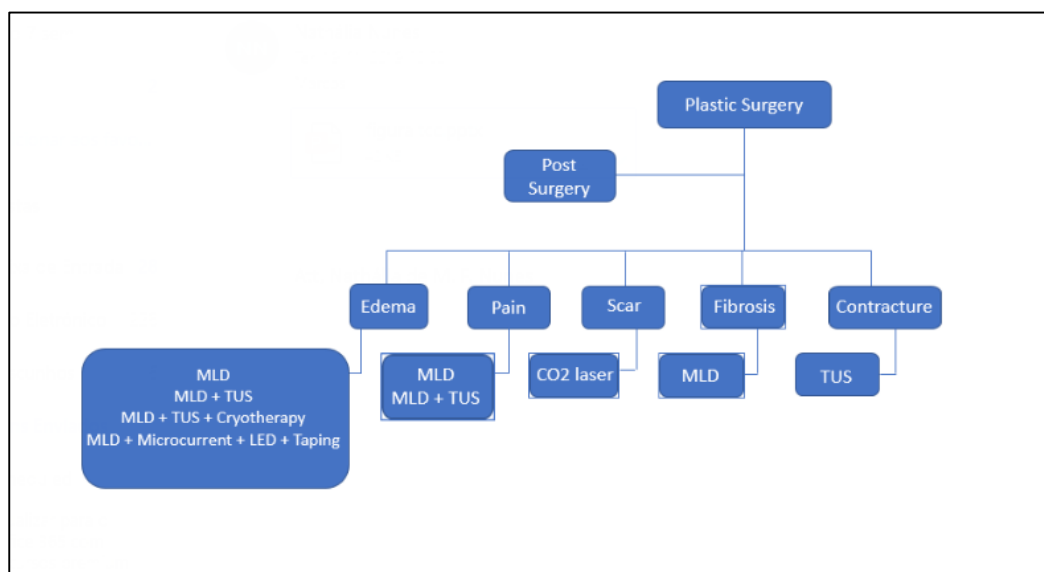
For the treatment of edema, Anny Chi et al (2018)<sup>3</sup> in the EG used preoperative nutricosmetic oral and topical antglucers and in the postoperative period MLD Leduc method, microcurrent, red LED and taping, EG had lower occurrence and greater reduction of edema compared to CG who had no preoperative follow-up<sup>3</sup>. For Igor F. B. Masson et al (2014)<sup>4</sup>, the application of TUS followed by the application of MLD Leduc method brought about a reduction in edema that was evaluated by perimetry<sup>4</sup>. According to Lucia Maria Alves Soares et al (2005)<sup>6</sup>, who applied MLD and MEDL for 10 sessions, the use of MLD appeared to have better results than MEDL<sup>6</sup>. For Mariana de Moraes Coutinho et al (2006)<sup>5</sup>, early use of MLD, ice pack cryotherapy and TUS also pointed to benefits for reducing edema<sup>5</sup>. Finally, for Mariana Marcelo Ceolin (2006)<sup>13</sup>, performing MLD once again proved effective in reducing edema<sup>13</sup>. Thus, 100% of the authors who treated edema showed positive results with the use of MLD, 20% associating MLD with oral and topical antifungal nutricosmetic, microcurrent, LED and taping, 20% associating MLD with TUS, 20% associating MLD with TUS and cryotherapy and 40% using MLD alone<sup>3,4,6,13</sup>.

In the treatment of pain, Igor B. F. Masson et al (2014)<sup>4</sup>, by applying TUS and MLD method Leduc abdomen and flanks allowed pain reduction in 100% of participants<sup>4</sup>. According Lucia Maria Alves Soares et al (2005)<sup>6</sup>, the implementation of the MLD led to reduction of pain to 100% of patients<sup>6</sup>. Finally, Mariana Marcelo Ceolin (2006)<sup>13</sup>, using MLD proved effective in reducing dor<sup>13</sup>. Therefore, the MLD

proved effective in reducing pain in 100% of rated items this aspect, 33% of the use of combination therapy MLD and TUS and 66% only use MLD<sup>4,6,13</sup>.

In the treatment of capsular contracture, Jorge Planas et al (1997) conducted a study with 24 eight women with unilateral or bilateral capsular contracture have been classified according to the degree Baker scale. The patients underwent a bra fitted with 4 TUS transducers in each breast that were directed to the affected region of the breast, applied in continuous or pulsed mode with 15Watts power with emission cycles according to the degree of contracture. The results showed that the use of reducing contractures TUS allowed at least 1 degree, even more severas contractures<sup>8</sup>.

For the treatment of scar appearance, the most used features are silicone gel topic and fractionated CO<sub>2</sub> laser<sup>10,11,14</sup>. According to Feiya Du et al (2018)<sup>10</sup>, from the application of fractionated CO<sub>2</sub> laser in 10 patients with a mean age of 34.5 years who presented scars without keloid formation and classified as type IV skin on the Fitzpatrick scale, the authors observed there was reduction of local erythema at 3 months and improved scar appearance without hyperpigmentation, hypopigmentation or scarring hypoplasia, evidencing the benefits of using CO<sub>2</sub> laser<sup>10</sup>. As for Sue-Min Kim et al (2014)<sup>14</sup>, 25 patients with average age of 37.52 years were submitted to the use of silicone gel sheet or topical silicone gel, where the authors noted that both techniques are beneficial for scar tissue treatment, with improvement in pigmentation, irregularity and size<sup>14</sup>. Finally, for Luiz Ronaldo Alberti et al (2017)<sup>11</sup>, the comparison of the use of silicone gel and gel associated with fractionated CO<sub>2</sub> laser, shows that the associated use allows better results regarding pigmentation, texture, size and flexibility of the scar. . Thus, it is evident that the combined use of the silicone gel with the laser is more effective than one of the techniques singly<sup>11</sup>.



**Figure 1.** Most effective methods, according to each complication

## 5 CONCLUSION

The literature review showed that the therapeutic approaches used as a functional and aesthetic reestablishment tool in the postoperative period of plastic surgery were: MLD, TUS and associated use of microcurrent, LED, fractional CO<sub>2</sub> laser and taping. It was concluded that MLD was the most used method among the studies, evidencing the wide efficacy of the technique for the treatment of edema, fibrosis, and pain. Due to the rise of plastic surgeries, the public who needs the care of a dermato-functional physiotherapist for postoperative intervention has increased, thus, it is always necessary to professionally update on the most appropriate techniques aiming at the best surgical outcome and patient comfort.

Due to the reduced amount of the studies found, more studies are necessary to propitiate richer data, so the Therapist can be better provided and safe when it comes to selecting an effective and trustworthy therapy.

## REFERENCES

- 1- Chi A, Oliveira AVM, Ruh AC, Schleder JC. O uso do linfotaping, terapia combinada e drenagem linfática manual sobre a fibrose no pós-operatório de cirurgia plástica de abdome. Fisioterapia Brasil, [S.l.], v. 17, n. 3, p. 197-203, out. 2016. ISSN 2526-9747.

- 2- Flores A, Brum KO, Carvalho RM. Análise descritiva do encaminhamento médico a tratamentos fisioterapêuticos dermato-funcionais nos períodos pré e pós-operatório de cirurgias plásticas cosméticas. *O Mundo da Saúde*. 35. 308-314. 10.15343/0104-7809.2011354308314.
- 3- Chi A, Lange A, Guimarães MVTN, Santos CB. Prevenção e tratamento de equimose, edema e fibrose no pré, trans e pós operatório de cirurgias plásticas. *Rev. Bras. Cir. Plást.*2018;33(3):343-354.
- 4- Masson IFB, Oliveira BDA, Machado AFP, Farcic TS, Júnior IE, Baldan CS. Manual lymphatic drainage and therapeutic ultrasound in liposuction and lipoabdominoplasty post-operative period. *Indiana J Plast Surg* . 2014; 47 (1): 70–76.doi: 10.4103 / 0970-0358.129627.
- 5- Coutinho MM, Dantas RB, Borges FS, Silva IC. A importância da atenção fisioterapêutica na minimização do edema nos casos de pós-operatório de abdominoplastia associada á lipoaspiração de flancos. *Revista Fisioterapia Ser* – Ano 1 – nr 4 – out/nov/dez 2006.
- 6- Soares LMA, Soares SMB, Soares AKA. Estudo comparativo da eficácia da drenagem linfática manual e mecânica no pós –operatório de dermolipectomia – *Revista Brasileira em Promoção da Saúde* 2005;18(4):199-204.doi:10.5020/18061230.2005.p199
- 7- Planas J. Prophylactic use of external ultrasound for breast implant capsular contracture. *Aesthetic surgery journal / the American Society for Aesthetic Plastic surgery*. 22. 205-7. 10.1067/maj.2002.123123.
- 8- Planas J, Migliano E, Wagenfuhr J, Castillo S. External Ultrasonic Treatment of Capsular Contractures in Breast Implants. *Aesthetic Plast Surg*. 1997 Nov-Dec;21(6):395-7.
- 9- Kim YH, Cha MS, Naidu S, Hwang WJ. Analysis of Postoperative Complications for Superficial Liposuction: A Review of 2398 Cases. *Plastic and reconstructive surgery*.127.86371.10.1097/PRS.0b013e318200afb.
- 10-Du F, Yu Y, Zhou Z, Wang L, Zheng S. Early treatment using fractional CO<sub>2</sub> laser before skin suture during scar revision surgery in Asians. *Journal of Cosmetic and Laser Therapy*.20.10.1080/14764172.2017.1358452.
- 11-Alberti LR, Vicari EF, Vicari RSJ, Petroianu A. Early use of CO<sub>2</sub> lasers and silicone gel on surgical scars: Prospective study. *Lasers in Surgery and Medicine*. 49. 10.1002/lsm.22634.

- 12-Nita AC, Orzan OA, Filipescu M, Jianu D. Fat Graft, Laser CO<sub>2</sub> and Platelet-Rich-Plasma Synergy in Scars Treatment. Journal of medicine and life. 6. 430-3.
- 13- Ceolin MM. Efeitos da Drenagem Linfática Manual no Pós-Operatório Imediato de Lipoaspiração no Abdome. Revista Fisioterapia Unisul, dez/2006.
- 14- Kim SM, Choi JS, Lee JH, Kim YJ, Jun YJ. Prevention of Postsurgical Scars: Comparsion of Efficacy and Convenience between Silicone Gel Sheet and Topical Silicone Gel. The Korean Academy of Medical Sciences 2014; 29: S249-253.
- 15- Souza RF. O que é um estudo clínico randomizado? Revista Medicina (USP - Ribeirão Preto) 2009; 42 (1): 3-8.