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Review of Physiotherapy Management in Post Operative Pedal Edema

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Abstract: ***Background: Edema is defined as the abnormal fluid accumulation in the interstitial space that exceeds the capacity of physiological lymphatic drainage. Pedal edema is the abnormal fluid retention in the tissue of the lower extremities. Reduced pedal edema is both preventable and treatable with Physiotherapy treatment. Physiotherapy includes electrotherapy and exercises therapy playing an important role in reduce pedal edema. The purpose of this systematic review was to determine which specific exercise therapy and electrotherapy programs are better for reducing pedal edema. Results: Most of the articles support Kinesio Tape, leg elevation, various types of stockings, compression garments, water immersion, active exercise, ankle toe movements and crepe bandaging. Conclusion: Physical therapist can play an important role in prevention and helping to avoid injuries and motivate their patients. The studies included in this review provided evidence to support the efficacy of Kinesio- Taping, leg elevation, compression garments, various types of stockings, crepe bandaging, active exercise, water immersion and massage exercise in reducing the pedal edema. Methods: A computerized search of the ELSEVIER, Pub Med, Cochrane Library, science citation data base was conducted for the period 2007 through 2017. The search was performed using English language.***

Keywords: Kinesiotaping, crepe bandaging, pedal edema, compression stockings, water immersion, leg elevation

1. Introduction

Edema in lower extremities, unilateral or bilateral, is called leg edema. An expansion of interstitial fluid volume may not be detected readily, but an excess of several liters causes visible and palpable swelling.[1] A prevalence of 20-27.2% has been reported for secondary lower limb lymphedema in patients who have undergone radical interventions, including pelvic lymph node dissection, radiation therapy and chemotherapy, for gynecological cancer.[2] Chronic edema and its potential progression to lympho venous edema and lymphoedema are common problem encountered by primary health care teams.[3] Interstitial fluid space is dependent on the hydrostatic and oncotic pressure gradient across the capillaries and also the lymphatic drainage. Capillary permeability, capillary hydrostatic pressure,

capillary oncotic pressure, lymphatic drainage.[4] Causes of pedal edema are cellulitis, allergic reaction, compartment syndrome, chronic venous insufficiency, congestive cardiac failure, renal failure, chronic liver disease and nephritic syndrome.[4] Symptoms of pedal edema are dyspnea on exertion, orthopnea and paroxysmal nocturnal dyspnea. Leg edema, along with fatigue and insomnia.[1] Treatment of pedal edema includes medical treatment, surgical treatment and physiotherapy treatment.[5] In physiotherapy treatment, Physiotherapy management of lymphedema includes pneumatic compression treatment, exercises, massage, Kinesio -Taping[6] elevation,[1], manual lymphatic drainage[5] and water immersion.[7]..

Author's Name	Year	Article Name
F.Amsler et al	2008	Compression therapy for occupational leg symptoms and chronic venous disorders.
Han-Ju Tsai et al	2009	Could kinesio tape replace the bandage in decongestive lymphatic therapy for breast-cancer-related lymphedema
Belczak Cleusa Ema Quilici et al	2009	Comparison of reduction of edema after rest and after muscle exercise in treatment of chronic venous insufficiency.
Carolyn Pierce et al	2009	Feasibility of treatment of lower limb edema with calf muscle pump stimulation in chronic heart failure.
Dariusz Bialoszewski et al	2009	Clinical efficacy of Kinesiology Taping in reducing edema of the lower limbs in patients treated with the Ilizarov Method.

Grade	*Description*	*Leg Edema*
0	None	No edema
1+	Trace	Barely detectable impression when finger is pressed into skin
2+	Mild	Slight identation, 15 seconds to rebound
3+	Moderate	Deeper indentation, 30 seconds to rebound
4+	Severe	>30 seconds to rebound

Grading of edema[8]

2. Methodology

- All studies involving techniques other than Physiotherapy.
- Study Design: Systematic review
- Data source: studies identified by searching ELSEVIER, Pub Med, Cochrane Library and by recursive checking of bibliographies.

Inclusion Criteria

- Studies published from year 2007- 2017.

- Studies - investigating the effects of various therapeutic techniques to reduce pedal edema.
- Gender – Both males and females

Exclusion Criteria

- Studies more than 15 year ago.
- Studies involving invasive procedures.
- All studies involving techniques other than Physiotherapy.

Procedure

Literature was reviewed from 2007-2017, studies identified by searching Medline, Pedro, Pub-med, and by recursive checking of bibliographies and from that studies data was collected. Treatment approaches were arranged and analyzed.

3. Result

18 articles from 12 years studies have been divided into 3 slots of 4 years each.

Studies conducted from 2007-2010

Author's Name	Year	Article Name
G.Mosti et al	2013	Occupational leg edema is more reduced by antigraduated than by graduated stockings.
Alireza Alizadeh-Ghavidel et al	2014	Prevention of edema after coronary artery bypass graft surgery by compression stockings.
Teresa Bronislawa Pop et al	2014	The influence of Kinesiology Taping on the reduction of lymphedema among women after mastectomy.

Studies conducted from 2011-2014

Author's Name	Year	Article Name
Maha A. Hassan et al	2015	Kinesio Tape versus compression garments on Post Mastectomy Lymphedema.
Guilherme S Nunes	2015	Kinesio Taping does not decrease swelling in acute, lateral ankle sprain of athletes.
Smyth RMD et al	2015	Interventions for varicose veins and leg edema in pregnancy
Seol-Ah Kang et al	2015	Comparative effectiveness of Taping Therapy versus compression stockings on edema, pain and fatigue in the lower extremities of hospital nurses.
Marzana Zaleska et al	2015	Intermittent pneumatic compression enhances formation of edema tissue fluid channels in lymphedema of lower limbs.
Yeong-Deok Choi et al	2016	Edema and pain reduction using transcutaneous electrical nerve stimulation treatment.
David B. Thordarson et al	2016	Intermittent pneumatic pedal compression and edema resolution after acute ankle fracture.
Dr. Nahed Fikry Hassan Khedr et al	2016	Effect of leg elevation versus water immersion on leg edema in third trimester of pregnancy.
Prashant Naik et al	2016	Comparison of Kinesio Taping & crepe bandaging in patients with post operative pedal edema.
Takuya Fukushima et al	2017	Immediate effects of active exercise with compression therapy on lower-limb lymphedema.

Studies conducted from 2015-2017

4. Discussion

The present study deal with the intervention to reduce the pedal edema by using different methods of physiotherapy treatment i.e electrotherapy and exercise therapy. Edema is defined as swelling of a body part due to accumulation of the interstitial tissue fluid. Crepe bandages are used as a form of compression therapy to help in draining the lymphatic fluid into the collateral channels. Lymph edema bandaging is a highly specialized form of bandaging which utilizes multiple layers of short stretched bandages for lymph edematous body segments. The conventional treatment to relive pedal edema was elevation and ankle toe movements. Elevation and ankle toe movements as a exercising tool in treatment of edema and concluded that elevation and ankle toe movements are helpful in reduction of edema. Kinesio taping is an elastic tape which provides a directional pull that guides the lymphatic fluid in the desired direction of drainage. This is important in routing and rerouting the lymphatic fluid in lymphatic vessels to reduce swelling.[6] Changes in lower-limb volume were significantly greater with high-load AECT than with CT. Severity of skin stiffness and pitting edema symptoms pre intervention correlated significantly with the volume decrement under both high- and low-load AECT.[2] Stockings providing less pressure had no comparable effect and stockings exerting higher pressure showed no advantage over those exerting moderate pressure. The amount of pressure applied to the leg was given by the manufacturer of the stockings. In only a few studies it was measured directly beneath the stockings using various techniques.[9] Reduction of lower limb edema in the group with water immersed compared to their baseline data .Regarding to the frequency distribution for the grade of leg edema in pre and post interventions.[7] Electrical stimulation treatments are one of the initial treatment methods of edema that enable quantitative management of the intensity, duration, and frequency of treatment for consistent and accurate treatment of the region of edema.[10]

In this systematic review 18 articles are taken they gave the positive and negative outcomes. The results of the study showed that the some protocols were well effective in reducing pedal edema. Such as **Dariusz Bialoszewski et al (2009)** suggested that edema reducing treatment in the form of lymphatic massage and kinesiology taping reduced lower limb edema in patient treated with Ilizarov method.[11] In this study **Prashant Naik et al (2016)** suggests that we can conclude that both kinesio taping and crepe bandaging give immediate effect by reducing post-operative edema. But kinesio taping is more effective than crepe bandaging in reducing pedal edema in post-operative patients. Hence kinesio tape can be used along with the conventional treatment to relieve edema.[6]

Dr. Nahed Fikry Hassan Khedr et al (2016) suggest that leg elevation and water immersion are necessary to alleviate edema in lower extremities during pregnancy.[7] **Yeong Deok Choi et al (2016)** suggest that application of transcutaneous electrical nerve stimulation was confirmed to be effective in reducing edema and pain.[10] **Takuya Fukushima et al (2017)** in this study suggest that high load AECT has marked effects on severe LLL.[11] Some protocols

gave negative outcome such as **Han-Ju Tsai et al (2009), Carolyn Pierce et al (2009), Guilherme S Nunes et al(2015), Seol-Ah Kang ets al (2015)** all contained results that revealed that there were no significant change in reduced pedal edema.

5. Limitation of the study

- A Limitation of this review is the inclusion of non-randomized clinical trials.
- Less numbers of articles were found for this study.

6. Conclusion

For systematic review on different treatment for reduced pedal edema articles were collected from 2007-2017. There were 18 studies conducted in which electrotherapy and exercise therapy were given to treat reduce pedal edema. Physical therapist can play an important role in prevention and helping to avoid injuries and motivate their patients.

7. Future Scope of Study

1) Statistical tools can be applied for review of content.
2) Studies to prove efficacy of physiotherapy intervention can be explored based on this review analysis.
3) Other studies like experimental studies, observational studies will be done in future.

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