بسم الله الرحمن الرحيم

سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

صدق الله العظيم

"البقرة آية ٣٢"

SYSTEMATIC REVIEW: EFFECT OF COMPRESSION THERAPY IN MASTECTOMY UPPER LIMB LYMPHEDEMA

By
Dina Mahmoud Nabeeh
B.Sc. in Physical Therapy
Faculty of physical Therapy
Cairo University
2015

ACKNOWLEDGEMENT

First of all, I would like to kneel thanking **ALLAH**, The most merciful who provided me with patience to achieve this work and graces that I could never be able to account.

I would like to express my deep gratitude and faithful thanks to Prof. Dr. Wafaa Husein Borhan , for the continuous supervision, endless patience and encouragement throughout the whole work.

No words will describe the greatest support, patience and real love from my kind mother

Dedication

To..

My mother
My Brother and
My sisters

For their patience and continuous support

INTRODUCTION

Evidence-based practice is a clinical decision-making approach resulting from integration of best scientific available evidence with patient values and clinical expertise.

Components of Evidence- Based Decision Making:

1-Research evidence

It involves tracking down the best and latest evidence from research articles that have been evaluated for validity and usefulness before applying their results to patient care

(Richardson,2000).

2-Clinical expertise

It refers to clinician's cumulated experience, education and clinical skills, it is important to identify patient's unique health state , diagnosis, risks and benefits of potential intervention, and personal values and expectations. (Sackett et.al, 2000)

3- Patient Values

The patient values mean the unique preferences, concerns and expectations; Each patient brings to a clinical encounter which must be integrated into clinical decisions to provide the most suitable patient services

(Sackett et.al,2000)

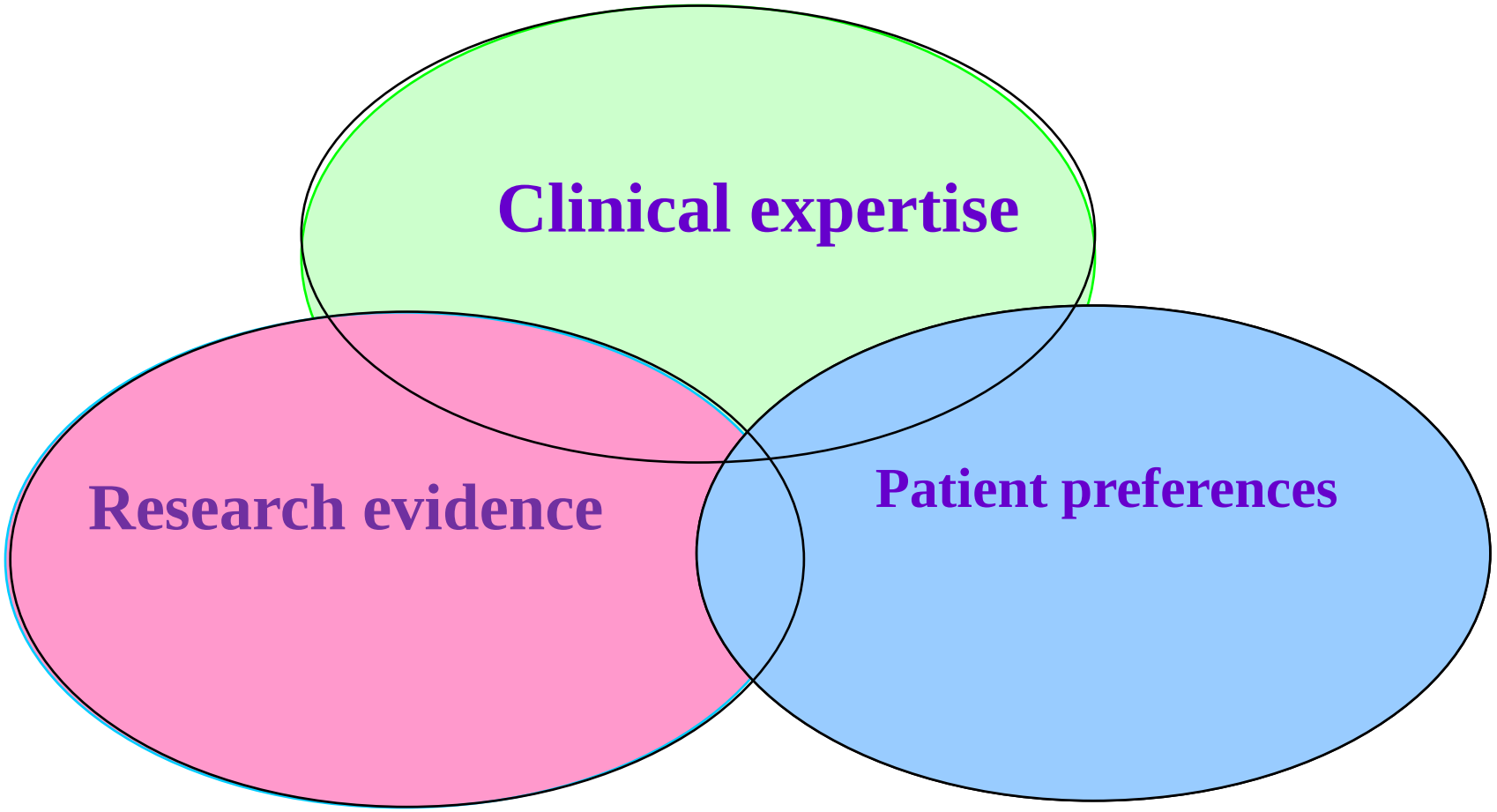


Figure (1)
Components of Evidence-Based Decision (Haynes and Haines, 1998).

This done through searching in the following sites:

- www.cochrane.com
- www.thecochranelibrary.com
- www.clinicalevidence.com
- www.tripdatabase.com
- www.guideline.com
- www.pubmed.com
- www.ovid.com

Levels of Evidence:

•Sackett et. al, (1996) developed a useful method of assessing research results based on the level of scientific evidence.

•The evidence then is applied to clinical situations .

•Large, well-designed randamized controlled trials RCTs are categorized as *level 1* evidence.

RCT studies have

- large numbers of subjects randomly assigned to either an intervention group or a control group,
- generating a great deal of confidence in the positive or negative results.
- These results can be generalized to patients similar to those studied.

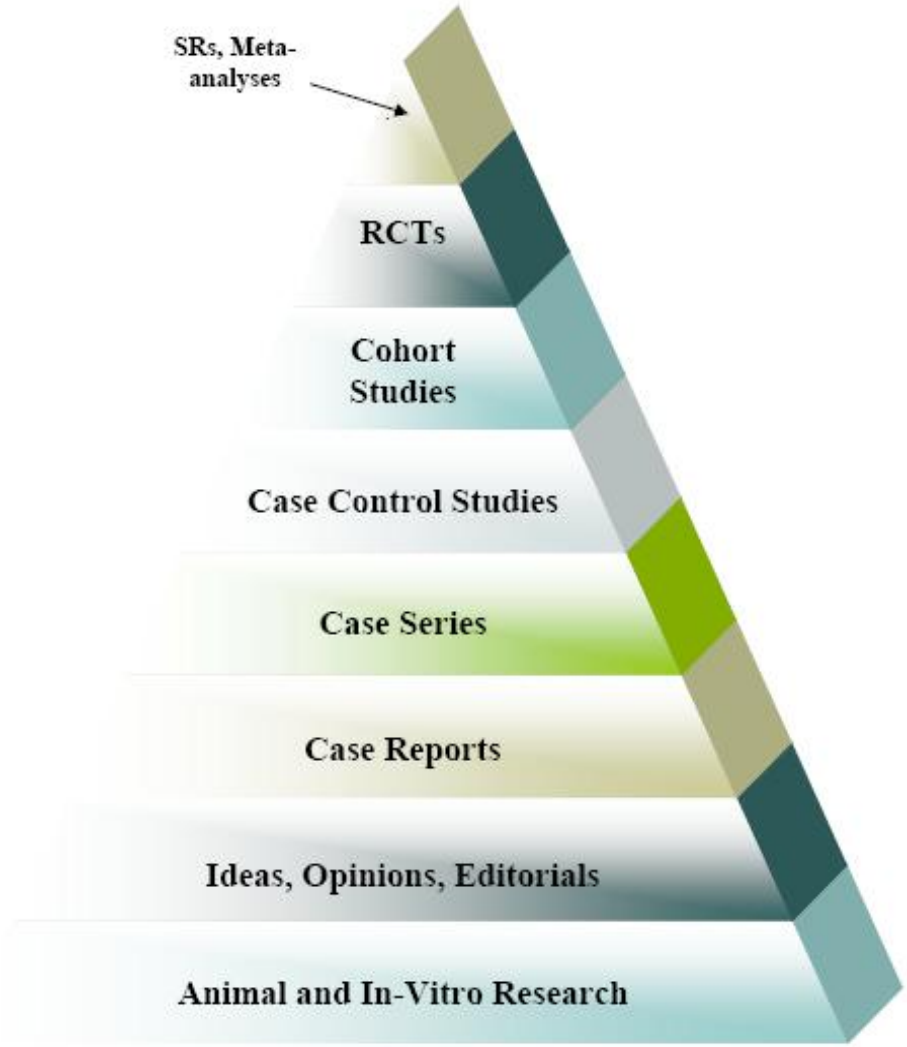


Figure (2):The pyramid of evidence in Evidence Based Medicine (Sackett and Rennie, 1992).

A Systematic review

- is a "study of studies".
- All relevant researches are analyzed in an effort to determine the overall evidence for an intervention.
- A systematic review is a literature review focused on a single clear question which tries to identify, select and appraise all high quality research evidence relevant to that question
- then makes assessment of the included studies and synthesis of findings and interpretation.

(Garg et al., 2008).

Lymphoedema

is a chronic condition which is characterized by generalized or regional accumulation of interstitial fluid that occurs primarily as a consequence of malformation, underdevelopment, or acquired disruption of the lymphatic circulation. It is classified into two forms: primary and secondary lymphedema

(Badger et al., 2004).

Post mastectomy Lymphoedema

- Breast cancer-related lymphedema results from obstruction or disruption of the lymphatic system associated with cancer treatment (removal of lymph nodes and radiotherapy)
-
- patient personal factors obesity or higher body mass index can increase the risk of lymphedema; and infections or trauma can trigger lymphedema. **(Fu MR et al., 2013).**

Management

- **Treatment regimen that includes** meticulous skin hygiene, manual lymph drainage, bandaging, exercises and supportive garments

- **Pharmacological management**: benzopyrones, flavonoids, diuretics, hyaluronidase, pantothenic acid

- **Surgical treatment** includes microsurgical lymphovenous or lympholymphatic anastomoses, debulking(**Fu MR, 2014).**

Components of compression therapy

Intermittent Pneumatic Compression Therapy (IPC

Manual lymph drainage (MLD)

Multi-layer, short-stretch compression bandaging

Statement of the problem:

Does compression therapy improves post mastectomy upper limb lymphedema?

Purpose of the study: The purpose of this study is to systematically review the effects of compression therapy on post mastectomy upper limb lymphedema.

Delimitations:

- Researches of randomized controlled trials on women who have upper limb post mastectomy lymphedema

- Published manuscripts in English language.

METHODOLOGY

»

- The methods used to carry out this systematic review of existing evidence for effectiveness of compression therapy on postmastectomy upper limb lymphedema , The following items concerning the methodology of the systematic review will be Explained
- I. Search Strategy
- II. Study Selection
- III. Data Extraction
- IV. Data Analysis

1-Search Strategy :

- Search was done in:
  - Pubmed (Medline),
  - the Cochrane Library and
  - Physiotherapy Evidence Database (PEDro)

- systematically review studies published in English language which study the effects of compression therapy on mastectomy upper limb lymphedema

Key words used in the search are :

1.Lymphedema

2. Intermittent pneumatic compression device

3. Compression therapy

4. compression sleeve

5. manual lymphatic drainage

2-study selection

- **Types of Studies:**

Published English studies with all research designs except expert opinions.

- **Types of Participants:**

The review included women with mastectomy upper limb lymphedema

- **Types of Interventions:**

This review included studies which demonstrate the effects of compression therapy on mastectomy upper limb lymphedema

Exclusion criteria:

- Unpublished studies.
- Studies that compared compression therapy with the effects of medications, surgery were excluded.
- Women with bilateral lymphedema
- Non-randomized control trials studies.

3. Data Extraction

Data from all the included studies were summarized in the format as suggested by the American Academy for Cerebral Palsy and Developmental Medicine (AACPDM). The format included: participants' characteristics (number in each group, target population, diagnosis, numbers in each diagnostic subgroup, and ages), intervention used, control used, research design and level of evidence for the study, and outcomes of interest.

Assessment of methodological quality:

- All the included studies were scored on their methodological quality with the Physiotherapy Evidence Database (PEDro) scale. (*PEDro, 2010)*

PEDRO scale:

Criteria	No	Yes
▪ Eligibility criteria were specified		
▪ Subjects were randomly allocated to groups (in a crossover study, subjects were randomly allocated in the order in which treatments were received)		
▪ Allocation was concealed		
▪ The groups were similar at baseline regarding the most important prognostic indicators		
▪ There was blinding of all subjects		
▪ There was blinding of all therapists who administered the therapy		
▪ There was blinding of all assessors who measured at least one key outcome		
▪ Measures of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups		
▪ All subjects for whom outcome measures were available received the treatment or control condition as allocated or, where this was not the case, data for at least one key outcome was analyzed by "intention to treat"		
▪ The results of between-group statistical comparisons are reported for at least one key outcome		
▪ The study provides both point measures and measures of variability for at least one key outcome		

IV. Data Synthesis:

The homogeneity among studies with regard to patients , interventions and outcome measures allow us to perform a quantitative analysis (meta- analysis).

eighht studies undergoes meta-analysis

RESULTS

Studies met inclusion criteria

Study	Title
Days et al (2013)	Randomized trial of decongestive lymphatic therapy for the treatment of lymph edema in women with breast cancer
Tambour et al (2014)	Effect of physical therapy on breast cancer related lymph edema
Devoogdt et al (2011)	Effect of manual lymph drainage in addition to guide and exercise therapy on arm lymph edema related to breast cancer
Godoy et al(2012)	Synergic effect of compression therapy and controlled active exercises using facilitating device in treatment of arm lymph edema
Szuba et al(2002)	Decongestive lymphatic therapy for patients with breast carcinoma associated lymph edema
E.Fife et al(2012)	A randomized controlled trial comparing two types of pneumatic compression for breast cancer related lymph edema treatment in the home
Kozanoglu et al(2009)	Efficacy of pneumatic compression and low level laser therapy in the treatment of post mastectomy lymph edema
Martin et al(2011)	Manual lymphatic drainage therapy in patients with breast cancer related lymph edema
Dini et al(1998)	The role of pneumatic compression in the treatment of post mastectomy lymph edema

Methodology assessment of studies according to the Physiotherapy Evidence Database (Pedro) scale

Criteria	Days et al(2013)	Tambour et al (2014)	Devoogdt et al (2011)	Godoy et al(2012)	Szuba et al(2002)	E.Fife et al(2012)	Kozanoglu et al (2009)	Martin et al(2011)	Dini et al
1-Specified eligibility criteria	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	yes
2-Random allocation of participants	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes	yes
3-Concealed allocation	Yes	Yes	Yes	no	yes	yes	yes	yes	no
4-Similar prognosis at baseline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes
5-Blinded participant	no	Yes	Yes	No	No	No	No	no	no
6-Blinded therapists	no	no	no	No	no	No	No	No	no
7-Blinded assessors	Yes	no	no	No	no	No	no	No	no
8-More than 85% follow-up for at least one key outcome	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes
9-'Intention to treat' analysis	Yes	Yes	Yes	Yes	yes	Yes	Yes	Yes	yes
10-Between group statistical analysis for at least one key outcome	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes
11-Point estimates of variability for at least one key outcome	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes
Pedro score	**8/10**	**8/10**	**8/10**	**6/10**	**7/10**	**7/10**	**7/10**	**7/10**	**6/10**

summarizes the characteristics of the research participants in these nine studies.

		Days et al(2013)	Tambour et al (2014)	Devoogdt et al (2011)	Godoy et al (2012)	Szuba et al (2002)	E.Fife et al (2012)	Kozanoglu et al(2009)	Martin et al (2011)	Dini et al (1998
	Research design	RCT	RCT	RCT	RCT	RCT	RCT	RCT	RCT	RCT
	Level of evidence	I	I	I	II	II	II	II	II	II
	Participant characteristics	Women with lymphedema	Patient with breast cancer related lymphedema	Patients with breast cancer	Patient with breast cancer related lymphedema	Patients with breast carcinoma with lymphedema	Patient with breast cancer related lymphedema	Patient with post mastectomy lymphedema	Patient with breast cancer related lymphedema	Patients with post mastectomy lymph edema
Nr of participants	Treatment Group	52	80	79	10	12	18 with APCD	Pneumatic group24	29	40
	Control Group	51	80	81	10	11	18 with SPCD	Low laser group23	29	40
	Age range	50-55	45-60	55-64	49_82	47_81	At least 18 years old	Mean age 48.3	Older than 18 years	62_72

summarizes the outcomes of interest of thesenine studies and codes the outcomes of interest.

	Godoy et al(2012)	Szuba et al(2002)	E.Fife et al (2012)	Kozanoglu et al (2009)	Martin et al (2011)	Days et al (2013)	Tambour et al (2014)	Devoogdt et al (2011)	Dini et al (1998
Intervention group	Short stretch compression sleeve made of cotton polyester textile and exercise apparatus denominated pulley system	Decongestive lymphatic therapy(DLT)AND adjunctive interment pneumatic compression (IPC)	Advanced pneumatic compression devices (APCD)	Pneumatic compression therapy 2 h of compression therapy for four weeks	Standard treatment plus manual lymphatic drainage for four weeks	Manual lymphatic drainage followed by compression garment	Complete decongestive therapy including manual drainage	Exercise therapy and manual lymphatic drainage	Intermittent pneumatic compression
Control group	exercise apparatus denominated pulley system without compression sleeve	Decongestive lymphatic therapy(DLT)alone	Standard pneumatic compression devices(SPCD)	Low level laser therapy20m of laser therapy for four weeks	Standard treatment (skin care .exercise and compression measures. Bandages for one month and subsequently compression garments)for four weeks	Elastic compression garment	Complete decongestive therapy without manual lymphatic drainage	Exercise therapy without manual lymphatic drainage	No treatment
Outcome of interest	The size of lymphedematous arms	Elasticity of skin and joint mobility and volume of lymphedema	Edema volume and local tissue water	Delta circumference and pain and grip strength and joint range of motion	Affected arm volume and concomitant symptomatology	Percent arm volume ,quality of life and arm function	Percentage volume reduction ,bodyweight, patient sensation of heaviness, patient sensation of tension and quality of life	Cumulative incidence of arm volume	**Delta circumference**
measures	Water displacement technique	Water displacement and tissue tonometry and goniometry	QulickII tape measure and tissue dielectric constant method	Tape measurement and visual analogue scale and goniometer and portable hydraulic hand dynamometer	Circometry and calculated using the formula of truncated cone	Short form 36 health survey , disabilities of arm, shoulder and hand scale and formula for truncated cone	Water displacement volumetry ,scale ranging from 0to10and EQ questionnaire	Water displacement method	**Instrumental devices and water displacement**
Component of health	Activity and participation	Activity and participation	Activity and participation	Activity and participation	Activity and participation	Activity and participation	Activity and participation	Activity and participation	**Activity and participation**

summaries means of study groups and control groups and difference between this means.

Studies	**Godoy et al(2012)**	**Szuba et al(2002**	**E.Fife et al(2012)**	**Kozanoglu et al(2009)**	**Martin et al(2011)**	**Days et al(2013)**	**Tambour et al (2014)**	**Devoogdt et al (2011)**	**Dini et al(1998)**
Out comes	The size of lymphedematous arms	volume of lymphedema	Edema volume	Delta circumference	Affected arm volume	Edema volume	Edema volume	Edema volume	**Delta circumference**
Mean of control group Pre Post differences	2015.1 2024.9 -9750	+32.7	3.104 3.013 0.091	18.9 13.9 5.1	5%	250 143 107	19%	12%	**14.6** **14.1** **0.5**
Mean of study group Pre Post Difference	1988.3 1963.7 24.650	-89.5	3.102 2.952 0.15	16.8 11.1 4.9	25%	453 203 250	24%	12%	**16.1** **14.2** **1.9**

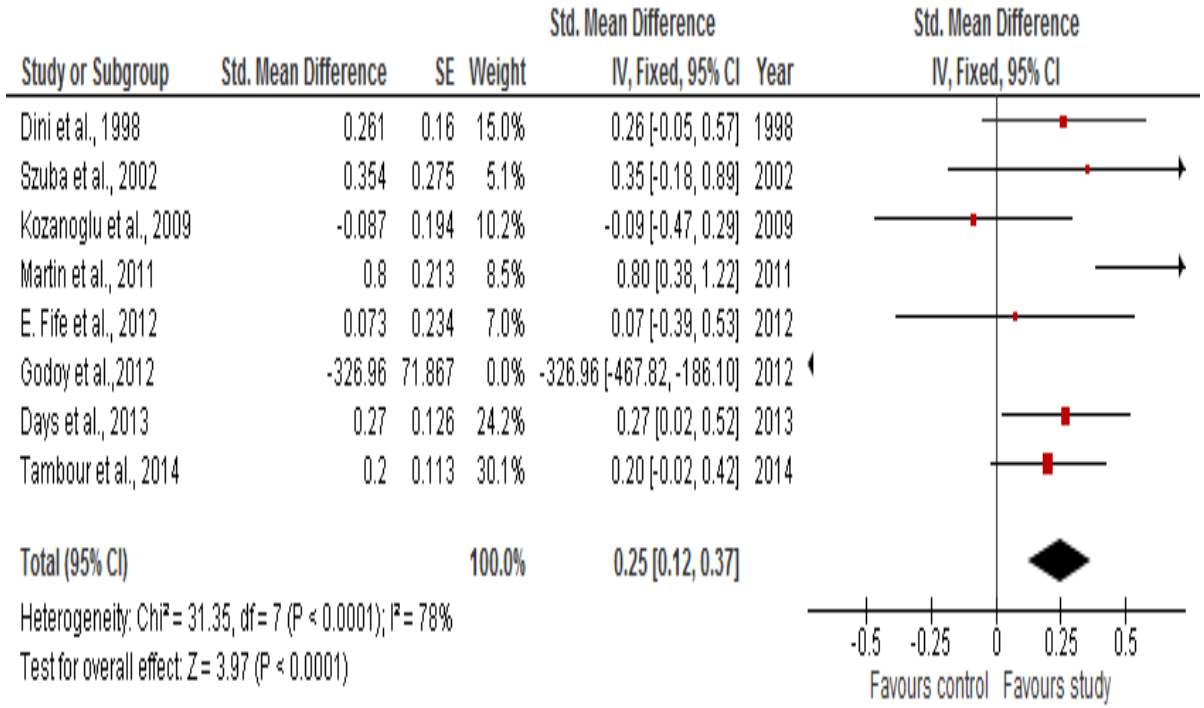
Summary of studies: outcomes, measures, and results

Group studies	Outcomes of interest	measures	Component of health		
			Body structures body functions	Activities and participation	Contextual factors
Godoy et al(2012)	The size of lymphedematous arms	Water displacement technique		yes	
Szuba et al(2002)	Elasticity of skin and joint mobility and volume of lymphedema	Water displacement and tissue tonometry and goniometry		yes	
E.Fife et al(2012)	Edema volume and local tissue water	QulickII tape measure and tissue dielectric constant method		yes	
Kozanoglu et al(2009)	Delta circumference and pain and grip strength and joint range of motion	Tape measurement and visual analogue scale and goniometer and portable hydraulic hand dynamometer		yes	
Martin et al(2011)	Affected arm volume and concomitant symptomatology	Circometry and calculated using the formula of truncated cone		yes	
Days et al(2013)	Percent arm volume	formula for atruncated cone		yes	
Tambour et al (2014)	Percent arm volume	Water displacement volumetry		yes	
Devoogdt et al (2011)	Percent arm volume	Water displacement volumetry		yes	
Dini et al(1998	Delta circumference	Instrumental devices and water displacement		yes	

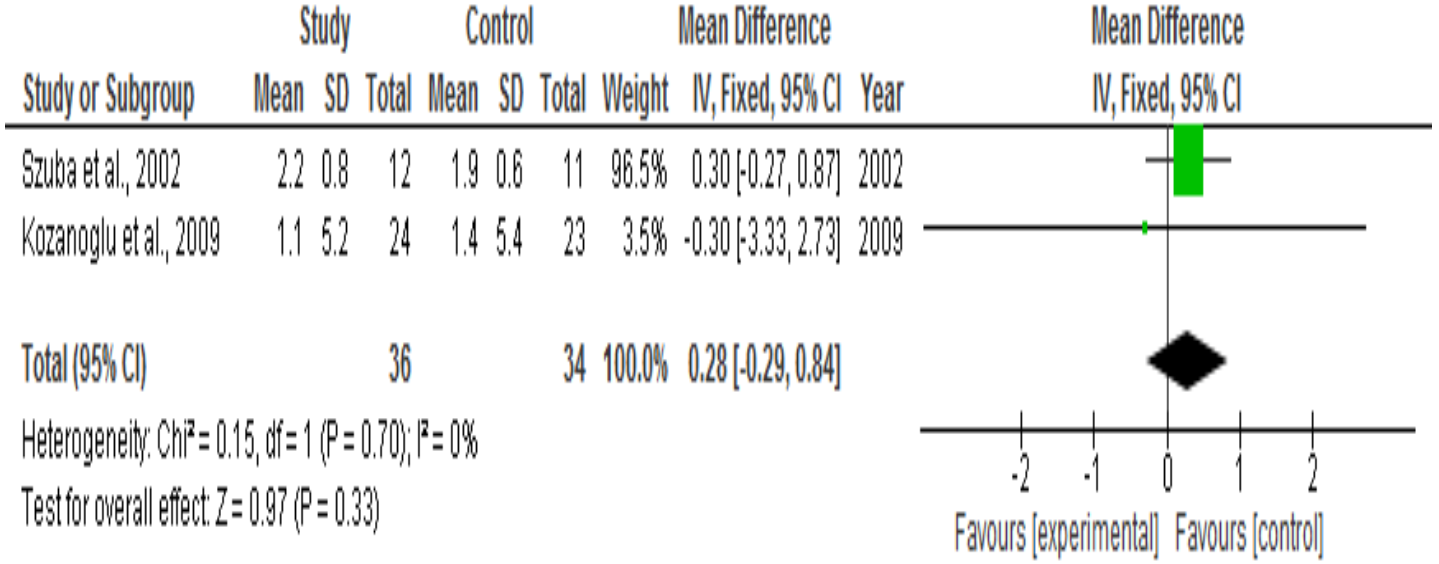
Contains information regarding the adverse events reported in each study

Study	Level of evidence	Total n	Method of ascertaining adverse event	Description of adverse events
Days et al(2013)	I	103	NS	_
Tambour et al (2014)	I	160	NS	_
Devoogdt et al (2011)	I	160	NS	_
Godoy et al(2012)	II	20	NS	_
Szuba et al(2002)	II	23	NS	_
E.Fife et al(2012)	II	36	NS	_
Kozanoglu et al(2009)	II	47	NS	_
Martin et al(2011)	II	58	NS	_
Dini et al(1998	II	80	NS	_

4-4META analysis:



Forest plot (1): Comparison between study and control groups regarding reduction in lymphedema volume



Forest plot of (2): Comparison between study and control groups regarding Joint mobility.

DISCUSSION

»

- The purpose of the current review was to evaluate the effectiveness of compression therapy on postmastectomy upper limb lymphedema

- this review includes studies published and searched on Medline data base through
  - Pub Med
  - Ovid that most likely include huge amount of papers published each year and also
  - PEDro , Physiotherapy Evidence Database , PEDro is a free database of over 18000 RCTs , SRs and clinical practice guidelines in physiotherapy,
  - Cochrane library also was searched and
  - Google web site

META-analysis

- **Days et al(2013),**
- **Tambour et al (2014),**
- **Godoy et al(2012),**
- **Szuba et al(2002),**
- **E.Fife et al(2012),**
- **Kozanoglu et al(2009),**
- **Martin et al(2011),**
- **Dini et al(1998)**

- Regarding reduction in lymphedema volume it was found that there is a great Significant difference between study groups and control groups.

- According to META-analysis for**Szuba et al(2002), Kozanoglu et al(2009)** regarding Joint mobility was found that there is no Significant difference between study groups and control groups.

From clinical point of view compression therapy has a great effect on lymphedema volume reduction in women with upper lymphedema post mastectomy

it is beneficial for improving pain and quality of life From the previous studies it can be concluded that compression therapy should be considered as a treatment supplement in the physical therapy program for upper limb lymphedema

It can be applied as an intervention to facilitate upper limb lymphedema volume reduction and compression therapy has no any significant difference on improving joint mobility and need more research.

Conclusionns

- The current level of evidence to support the effectiveness of compression therapy on upper limb post mastectomy lymphedema is strong.

- according to this review there is support enough to use compression therapy in treatment of upper limb post mastectomy lymphedema to reduce lymphedema volume but need more research on its effect on joint mobility

conclusion

(1) there appears to be strong evidence of compression therapy in treatment of upper limb lymphedema volume

(2) there is no evidence of compression therapy in treatment of joint mobility

RECOMMENDATIONS

- It is recommended that physical therapists should have a positive attitude about evidence based practice and to be interested in learning and improving the skills necessary to implement evidence based practice.

It is recommended to do further research using systematic reviews to study the effect of compression therapy on joint mobility in patient with upper limb post mastectomy lymphedema

- More searches is needed for effect of each technique of compression therapy isolated from each other


Thank you
www.powerpointbackground.net