



# Faculdade de Medicina de São José do Rio Preto

## Programa de Pós-Graduação em Ciências da Saúde

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Tânia Dias Guimarães

Meias de Gorgurão como Monoterapia no  
Tratamento do Linfedema de Membros Inferiores

São José do Rio Preto

2014

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*“Talvez não tenha conseguido fazer o melhor,  
mas lutei para que o melhor fosse feito. Não  
sou o que deveria ser, mas graças a Deus, não  
sou o que era antes”. (Marthin Luther King)*

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## LISTA DE ABREVIATURAS E SÍMBOLOS

AVDs	Atividade de vida diária
CEAP	clínica, etiológica, anatômica e fisiopatológica.
cm	centímetro
Co	sem sinais visíveis ou palpáveis de doenças venosas.
C <sub>1</sub>	telangectasias ou veias reticulares.
Dra.	Doutora
Dr.	Doutor
EUA	(United States of America) Estados Unidos da América.
Et al	e outros
Famerp	Faculdade de Medicina de São José do Rio Preto.
Profa.	Professora
Prof.	Professor
mL	mililitros

mmHg	milímetros de mercúrio
n <sup>o</sup>	numero
P	probabilidade de significância
SP	São Paulo.
%	porcentagem
<	menor
>	maior

## RESUMO

**Introdução:** Na dificuldade de associação de terapias, o mecanismo de contenção é preferencialmente uma das escolhas como terapia única no tratamento do linfedema.

**Objetivo:** O objetivo do presente estudo foi avaliar a eficácia da monoterapia por um mês na redução do volume do linfedema de membros inferiores, usando a meia de gorgurão com avaliação semanal. **Casuística e Método:** Foram avaliados em ensaio clínico, prospectivo, consecutivo 26 pacientes com linfedema de membros inferiores localizados abaixo do joelho uni ou bilateral, sendo seis do sexo masculino e 20 do sexo feminino. As idades variaram entre 26 a 72 anos e a média de idade 49 anos, na Clínica Godoy- São Jose do Rio Preto, em 2013. Foram inclusos pacientes com diagnóstico clínico de linfedema, grau II de membros inferiores, independente da causa, porém localizado abaixo do joelho. Excluídos pacientes com história de alergias e intolerância a mecanismos de contenção, processos infecciosos ativos, imobilidade articular e outras causas que pudessem interferir nos edemas em geral. Todos os pacientes assinaram termo de consentimento informado e foram avaliados pela volumetria, por técnica de deslocamento d'água, no início do tratamento e semanalmente. Tiveram orientação sobre a meia, da necessidade de ajustes constantes, de como ajustá-la e de seus cuidados. Nos retornos eram avaliadas as variações volumétricas dos membros, a tolerância das meias, intercorrências, seu uso correto e a necessidade de ajustes que era realizada pela costureira, após a avaliação e orientação da equipe. Os dados foram catalogados numa planilha Excel. O estudo foi aprovado pelo Comitê de Ética em Pesquisa. Variáveis quantitativas foram descritas por média e desvio - padrão na presença de distribuição normal ou mediana e a amplitude interquartil na presença de

distribuição assimétrica. A relação destas variáveis com a presença dos desfechos foi comparada utilizando-se o teste de Wilcoxon's, considerando-se erro alfa de 5%.

**Resultados:** Foram avaliados 49 membros inferiores em 26 pacientes com linfedema de membros inferiores e detectadas as variações positivas e negativas durante o tratamento com meia de gorgurão. Na primeira semana foi observado que em 15 membros (30,61%) houve aumento de volume e em 34 reduções de volume (69,38%); na segunda semana cinco (10,20 %) mantiveram o aumento e 44 (89,79%) tiveram redução; na terceira semana quatro (8,16%) manteve o aumento e 45 (91,83%) com redução e na quarta semana apenas três (6,12%) dos membros mantiveram aumento e 46 (93,87%) reduziram. As reduções foram significante estatisticamente valor  $p < 0,001$  em todas as avaliações quando se comparou o início do tratamento com as demais semanas; a primeira semana com as demais; a segunda com as demais, porém a terceira comparada com a quarta não houve diferença significativa, valor  $p < 0,07$ . **Conclusão:** A meia de gorgurão como monoterapia é eficaz na redução do edema no tratamento do linfedema grau II localizado abaixo do joelho. Porém os pacientes devem ser orientados e treinados para o uso correto desta meia.

**Palavras chaves:** Linfedema, Tratamento, Compressão.

## ABSTRACT

**Introduction:** With difficulties to associate different therapies, a compression mechanism is the best choice of monotherapy in the treatment of lymphedema.

**Objective:** The aim of the current study was to assess over one month the effectiveness of a compression mechanism as monotherapy to reduce the volume of leg lymphedema using a cotton-polyester (grosgrain) stocking.

**Patients and Method:** In 2013, 26 consecutive patients with one-sided or bilateral lower leg lymphedema were assessed in a prospective clinical trial in the Clinica Godoy, Sao Jose do Rio Preto, Brazil. Six participants were male and 20 were female with ages ranging from 26 to 72 years (mean: 49 years). All patients with clinical diagnosis of grade II lower leg lymphedema regardless of the cause were included. Patients with a history of allergies, intolerance of compression mechanisms and those with infections, joint immobility and other conditions that might interfere with edema were excluded. All patients were evaluated by volumetry using the water displacement technique, at the beginning of treatment and weekly thereafter. The mechanism of compression was explained to all participants and they were advised about the need of frequent adjustments, how to adjust the stockings and the necessary care. At each consultation, volumetric variations, the patient's tolerance to treatment, adverse events, correct usage and the need for adjustments were assessed. Major adjustments were made by a seamstress after evaluation by the treatment team. The data was input on a Microsoft Excel spreadsheet. The study was approved by the Research Ethics Committee and all patients signed informed consent forms. Quantitative variables are reported as means and standard deviation when the distribution was normal or medians and

interquartile range when the data was asymmetric. The relationships of these variables in respect to the outcomes were compared using the Wilcoxon test with an alpha error of 5% being considered acceptable. **Results:** Forty-nine legs of the 26 participants with lymphedema were assessed. From week to week, both positive and negative variations were detected during the treatment using grosgrain stockings. In the first week, fifteen (30.61%) limbs increased in volume and 34 (69.38%) reduced in size. In the second week, five (10.20%) continued to increase and 44 (89.79%) reduced; in the third week four (8.16%) had further increases and 45 (91.83%) reduced and in the fourth week only three limbs (6.12%) continued to increase and 46 (93.87%) reduced in size. As a total, the reductions were statistically significant ( $p\text{-value} < 0.001$ ) in all evaluations when the baseline is compared with the other weeks, the first week with the others and the second week with the others, but there was no significant difference between the third and fourth weeks ( $p\text{-value} = 0.07$ ). **Conclusion:** The grosgrain stocking as monotherapy is effective in reducing swelling in the treatment of grade II lower leg lymphedema. Patients should receive guidance and be trained in respect to the correct usage of compression stockings.

**Keywords:** Lymphedema, Treatment, Compression.

# ***INTRODUÇÃO***

## 1- INTRODUÇÃO

O linfedema é o acúmulo de água, sais, eletrólitos, proteínas de alto peso molecular e outros elementos no espaço intersticial resultante de alterações dinâmicas ou mecânicas do sistema linfático. Como resultado há aumento progressivo de uma região de extremidade ou parte do corpo com diminuição da capacidade funcional e imunológica e mudanças morfológicas. <sup>(1,2)</sup>

No mundo é a segunda doença que mais leva à desabilidade ao trabalho, <sup>(3,4)</sup> entretanto observa-se uma carência de trabalhos clínicos em áreas específicas que suportam e orientem o tratamento. Os pacientes afetados experiênciam problemas físicos e psicossociais importantes e que na sua maioria afeta diretamente a qualidade de vida. <sup>(5)</sup>

Em relação à epidemiologia, a literatura mostra-se bastante precária quanto à investigação da prevalência no linfedema. É estimada uma prevalência de 1,15 por 100.000 crianças com linfedema primário nos EUA, sendo que a menarca está associada ao surgimento do edema precoce. <sup>(6)</sup> Estimativa populacional relata uma prevalência de edema crônico de 1,33 para 1.000 pessoas, aumentando de 5,4 para 1.000 em pacientes acima de 65 anos de idade. <sup>(7)</sup> As principais causas do linfedema secundário, são as neoplasias, traumas, processos inflamatórios e infecciosos. <sup>(8,11)</sup> Entre as causas de linfedema secundário a filariose é a mais prevalente e afeta em torno de 120 milhões de pessoas no mundo. <sup>(12)</sup>

A doença geralmente acomete as extremidades, podendo também acometer a face e a genitália. Em geral em membros inferiores inicialmente causa desde um discreto edema do membro, reversível ao repouso nas fases iniciais da doença, até

deformidades da extremidade com alteração da sua forma (elefantíase) nos estágios mais avançados. O diagnóstico e o tratamento precoces são fundamentais para evitar deformidades significativas.

Em relação à classificação, o linfedema pode ser classificado quanto a sua etiologia, estágio clínico da doença e a severidade.

### **Classificação Etiopatogênica**

O linfedema pode ser primário ou secundário, sendo o primário caracterizado por alteração nas vias linfáticas, desde o nascimento, podendo manifestar-se ao longo de sua vida. Nos secundários as vias linfáticas estão íntegras ao nascimento, mas no transcorrer da vida podem ser agredidas por diferentes causas, como as neoplasias, infecções, inflamatórias, traumáticas, imobilidade e doenças venosas e outras se tornando deficientes, resultando na formação do linfedema. <sup>(12,13)</sup>

Os linfedemas primários foram divididos em três grupos de acordo com a manifestação clínica por idade: congênito, precoce e tardio. No congênito surgem antes do segundo ano de vida, no precoce entre o segundo e 35º ano de vida e os linfedemas tardios surgem acima dos 35 anos de vida. <sup>(14)</sup>

### **Classificação do Estágio Clínico**

A classificação do estágio clínico é importante e vários modelos foram propostos. Um modelo de classificação mais sugerido é dividido em quatro estágios: estágio 0, que é uma fase latente ou subclínica; estágio I, o paciente acorda sem edema e desenvolve no transcorrer do dia; no estágio II, ele acorda com a perna edemaciada e

agrava com o transcorrer do dia. O estágio III (elefantíase) é uma fase mais avançada em relação ao estágio II no qual aparecem as deformidades. <sup>(15)</sup>

### **Classificação da Severidade pelo Volume**

Considera-se leve <20%; moderado entre (20-40%) e grave > de 40% do volume em relação ao membro contralateral. <sup>(16)</sup> A volumetria, uma técnica que avalia por deslocamento de água, é também chamada de pletismografia de água, padrão de ouro de avaliação. <sup>(18)</sup> A perimetria é outro método simples de avaliação que utiliza uma fita métrica para avaliar de forma padronizada o membro. <sup>(19)</sup>

### **Diagnóstico do Linfedema**

O diagnóstico do linfedema é feito por meio de história, exame físico e exames complementares quando necessários. Uma anamnese e exame físico detalhado e específico como a evolução dos sinais e sintomas, episódios de infecção, presença de lesões na pele, trauma, presença de sinal de *Stemmer* em linfedemas, edema em outras partes do corpo diferente da relatada pelo doente. Os exames complementares como a volumetria, perimetria, bioimpedância e a linfocintilografia são os mais utilizados. Outros exames como ultrassonografia, ressonância magnética e tomografia detectam a presença do edema, porém são considerados menos específicos.

### **Linfocintilografia**

A linfocintilografia é o exame mais específico no diagnóstico do linfedema trazendo informações funcionais do sistema linfático. Realiza injeção intradérmica de

rádio fármaco localizada geralmente entre os dedos seguidos de aquisição de imagens através de uma gama-câmara. <sup>(20, 21)</sup>

### **Bioimpedância**

Método de quantificação da composição corporal que permite uma avaliação mais específica de componentes como água intra e extracelular de segmentos, membro superiores, inferiores e tronco. <sup>(22)</sup>

### **Tratamento do Linfedema**

Mesmo com os avanços na compreensão da doença, a abordagem torna-se essencialmente multiprofissional. <sup>(23)</sup> Em relação ao tratamento do linfedema não há consenso. Contudo, a associação entre as várias terapias é preconizada. <sup>(24,2)</sup>

A associação de terapias inclui: drenagem linfática manual, <sup>(25,27)</sup> mecânica, <sup>(28,30)</sup> exercícios e atividades linfomocinéticas, <sup>(31,33)</sup> mecanismo de contenção, <sup>(34,36)</sup> cuidados higiênicos e AVDs, <sup>(37)</sup> suporte psicológico <sup>(38,39)</sup> e orientação nutricional. <sup>(2)</sup> Godoy & Godoy propõem a associação à terapia linfática cervical que é uma técnica que pode ser utilizada de forma isolada nos linfedemas de cabeça e pescoço e em crianças. <sup>(40)</sup>

Na dificuldade de associação de terapias, o mecanismo de contenção é preferencialmente uma das escolhas como terapia única. A compressão é essencial no procedimento terapêutico nas doenças linfo-venosas. <sup>(41)</sup>

## **Mecanismo de Compressão**

A compressão é definida como aplicação de tensão sobre uma superfície corpórea seja elástica ou não elástica cuja pressão é transmitida para os tecidos subjacentes. <sup>(42)</sup>

## **Tipos de Pressão**

### **a) Pressão de repouso**

É a pressão de interface, pele/meia, gerada pelo tecido na posição de repouso do membro. Depende do tipo de material, da elasticidade e sobreposição.

### **b) Pressão de trabalho**

Pressão trabalho é a pressão de interface pele/meia gerada pelo mecanismo de compressão durante a atividade muscular. Portanto, necessita do trabalho muscular, fato que, se difere da pressão de repouso e é avaliada de forma dinâmica. Depende basicamente da resistência do material e do trabalho muscular. <sup>(43)</sup>

## **Tipos de compressão**

Podem ser utilizados materiais elásticos e inelásticos e destacam-se as formas de bandagens, meias e braçadeiras. Nesses materiais avaliam-se a extensibilidade que significa a capacidade do material para aumentar seu comprimento ou a largura ao ser esticada. A elasticidade é a sua capacidade de retornar à sua forma e tamanho inicial após o estiramento.

As bandagens são classificadas pelo tipo de matéria prima na sua confecção, podendo ser de fibras naturais ou sintéticas; estado físico úmidas ou secas e ainda

adesivas que normalmente são compostas por látex ou polacryl e ou óxido de zinco. Desta forma o que diferencia a bandagem inelástica da elástica é a extensibilidade máxima do material e o seu retorno à forma inicial. <sup>(44)</sup>

A bandagem inelástica tem característica de inestensibilidade, muito baixa elasticidade com um coeficiente de < 40%; baixa elasticidade com um coeficiente de < 70%; a de moderada elasticidade com coeficiente entre 70 a 140% e alta elasticidade mais de 140%. <sup>(45)</sup>

### **Meias elásticas**

As meias elásticas exercem pressões de trabalho e de repouso, na interface entre a meia e a pele. A atividade muscular provoca variações do tipo de onda de pulso na pressão, semelhante ao que ocorre no sistema venoso pela contração muscular. A integridade da 'bomba' muscular é crucial para efetivamente gerar gradientes de pressão durante atividades. <sup>(46)</sup>

A eficácia das meias depende da compressão alcançada e o correto uso. As indicações terapêuticas e profiláticas para meias elásticas já estão bem estabelecidas no contexto da Medicina Baseada em Evidências.

O Grupo de Estudo Internacional de contenção (International Compression Club) relata a sua classificação e indicações das meias elásticas: classe 20mmHg, Na prevenção do edema ocupacional, casos iniciais CEAP (clínica, etiológica, anatômica e fisiopatológica) (C0 s e C1 s); 20-30mmHg em pós-escleroterapia em microvarizes, prevenção dos sintomas de insuficiência venosa, durante a gestação, prevenção do edema venoso em pacientes CEAP3; 30-40mmHg no tratamento de trombose venosa profunda, prevenção da síndrome pós-flebítica, no tratamento do paciente CEAP 4,

tratamento da úlcera venosa aberta, prevenção de recidiva da úlcera (CEAP 5) e linfedema. <sup>(43)</sup>

Cabe ressaltar que as contraindicações desta terapia são as mesmas formais para o uso da meia elástica, tais como, doença arterial periférica, flebites sépticas, infecções de pele dos membros inferiores, incompatibilidade com o material de meias de compressão (alergia), linfangites, erisipelas, eczemas de pele, neuropatia periférica avançada, insuficiência cardíaca e descompensada, desproporção tornozelo/perna. <sup>(47)</sup>

### **Meias de Gorgurão**

As evoluções das meias trazem novas contribuições ao tratamento do linfedema no qual a meia não elástica pode melhorar os resultados. A meia de gorgurão desenvolvida por Godoy & Godoy <sup>(2)</sup> como opção terapêutica de baixo custo, com possibilidade de independência do paciente em colocar quantas vezes necessárias no seu dia a dia. Este nova opção de compressão tem demonstrado eficácia no tratamento do linfedema, desde que sejam realizados ajustes constantes sempre que houver redução do edema. Estudos utilizando a contenção de gorgurão associada a outras formas de tratamento no linfedema foram eficazes na redução aguda do volume do edema e na manutenção dos resultados. <sup>(25, 36,48)</sup>

O gorgurão é um tecido que tem elasticidade no sentido longitudinal e isto permite a flexibilidade do membro. No sentido transversal há baixa elasticidade <50, portanto, preenchendo os requisitos sugeridos no tratamento do linfedema. Neste sentido o tecido é feito de forma ondulada (canelado) que permite uma extensibilidade e gerando uma pressão de repouso variável de acordo com o ajuste no membro de pode variar em torno de 10 a 25 mmHg, portanto, gerando uma pressão de repouso. Desta

forma esta contenção gera pressão de repouso e de trabalho. <sup>(49)</sup> Tecnicamente este material preenche estes requisitos que são essenciais nos mecanismos de contenção.

A meia de gorgurão é confeccionada sob medida, com tecido feito de poliéster, poliamida ou associado com algodão. O fechamento pode ser utilizado por um zíper para as braçadeiras, velcro bem como ilhós na forma de cadarço para as meias, sendo que esta forma permite ao paciente manter a meia sempre ajustada.

### **1.1 Justificativa**

Não há um mecanismo de compressão de consenso no tratamento do linfedema. As limitações tanto no mecanismo de compressão desses materiais como na sua colocação resultam em algumas dificuldades terapêuticas. Muitas vezes o custo do material e sua disponibilidade tornam-se inviável para a terapia desses pacientes. O gorgurão é um tecido não elástico, porém devido a sua configuração que tem variações de extensibilidade transversal e longitudinal, que preenche as características necessárias para compressão no linfedema. Uma maior extensibilidade no sentido longitudinal permite a flexibilidade do membro. Uma baixa extensibilidade no sentido transversal (menor 50) permite um ajuste e uma compressão adequada. Estudos anteriores no tratamento do linfedema mostram que esse material associado às atividades de vida diária permite a redução do volume do membro. Desta forma, a avaliação deste material como terapia única no linfedema de membros inferiores faz-se necessária.

## **1.2 Objetivos**

### **Objetivo geral**

Avaliar a eficácia na redução do volume dos membros inferiores com o uso da meia de gorgurão.

### **Objetivos específicos**

1-Avaliar a redução do edema a cada semana;

2-Avaliar a frequência de normalização do edema com a essa terapia;

3-Avaliar intercorrências como o aumento do volume do membro e a intolerância ao material.

# ***CASUÍSTICA E MÉTODO***

## **2- CASUÍSTICA E MÉTODO**

### **2.1- Desenho**

Foram avaliados em ensaio clínico prospectivo consecutivo 26 pacientes com linfedema de membros inferiores, a monoterapia usando-se meia de gorgurão na redução do edema dos membros avaliados pela volumetria semanalmente durante um mês.

### **2.2- Casuística e local**

Foram estudados 26 pacientes com linfedema de membros inferiores localizados abaixo do joelho uni ou bilateral, sendo seis deles do sexo masculino e 20 do sexo feminino, com idade variando entre 26 a 72 anos, e média de idade 49 anos, na Clínica Godoy- São Jose do Rio Preto, SP, em 2013.

### **2.3 Critérios de inclusão**

Foram inclusos os pacientes com diagnóstico clínico de linfedema, grau II de membros inferiores, independente da causa, porém localizado abaixo do joelho.

### **2.4 Critérios de exclusão**

Pacientes com história de alergias e intolerância aos mecanismos de contenção, processos infecciosos ativos, imobilidade articular e outras causas que pudessem interferir nos edemas em geral foram excluídos do estudo.

## 2.5 Randomização

Todos pacientes foram inseridos consecutivamente por ordem de chegada à clínica e que aceitaram participar do estudo.

## 2.6 Desenvolvimento

Todos pacientes tiveram como tratamento a meia de gorgurão como terapia única. O gorgurão é uma meia inelástica, que permite um estiramento tanto longitudinal como transversal, sendo maior no sentido longitudinal e pequeno  $<50$  no transversal. Ela é feita sob medida e seu fechamento com ilhós. Este tipo de fechamento permite o seu ajustamento pelo próprio paciente. O controle das meias foi semanal com avaliação para necessidade de seu ajuste (decorrente da redução volume, incômodo em alguma parte do membro); intercorrências (dor, intolerância, não uso, alergias); volume do membro (volumetria) e seu uso correto. A avaliação do edema foi feita pela volumetria em todos os retornos e técnica de avaliação por deslocamento de água.

Figura 1. Ilustra meia de *gorgurão*



## **2.7 Considerações estatísticas**

Variáveis quantitativas foram descritas por média e desvio-padrão na presença de distribuição normal ou mediana e amplitude interquartil na presença de distribuição assimétrica. A relação destas variáveis com a presença dos desfechos foi comparada utilizando-se o teste Wilcoxon's, considerando erro alfa de 5%.

## **2.8 Considerações éticas**

O estudo foi avaliado e aprovado pelo Comitê de Ética em Pesquisa da Faculdade de Medicina de São José do Rio Preto-FAMERP, aprovação nº 172 286/2012. Os pacientes assinaram termo de consentimento informado, após a explicação dos objetivos do estudo e seu aceite em participar.

# ***RESULTADOS***

### 3. RESULTADOS

Foram avaliados 49 membros em 26 pacientes com linfedema de membros inferiores e detectadas variações volumétricas positivas e negativas durante o tratamento com meia de gorgurão nas quatro semanas, conforme Tabela 1 e Tabela 2.

Na primeira semana foi observado que 15 membros (30,61%) tiveram aumento de volume e 34 tiveram reduções (69,38%); na segunda cinco (10,20 %) mantiveram o aumento e 44 (89,79%) tiveram redução; na terceira semana 4 (8,16%) mantiveram o aumento e 45 (91,83% ), redução e na quarta semana, apenas 3 (6,12%) dos membros mantiveram aumento e 46 (93,87%) reduziram.

Foi detectado que na segunda semana dois (4%) membros estavam sem edema; na terceira semana oito membros (16,32%) e na quarta semana 19 membros (38,77%), conforme tabela 3. A Tabela 4 mostra a mediana dos 41 membros dos 49 avaliados até a quarta semana.

Encontrou-se redução significativa da mediana dos volumes quando se comparou volume inicial com há primeira semana (teste Wilcoxon's) valor  $p < 0,0001$ ; inicial e a segunda semana valor  $p < 0,0001$ , inicial e a terceira semana; inicial e a quarta semana valor  $p < 0,0001$ . Quando se comparou há primeira semana com segunda semana valor  $p < 0,0001$ , na primeira com a terceira semana valor  $p < 0,0001$  e primeira com a quarta semana valor  $p < 0,0001$ . Comparando-se há segunda semana com terceira valor  $p < 0,006$ , a segunda com quarta valor  $p < 0,006$ . Comparando a terceira com há quarta semana valor  $p < 0,071$  (Tabela 5). As Figuras 1 a 4 mostram variações interquartílica da mediana do volume pré-tratamento e pós-tratamento entre o início e cada semana avaliada. A Figura 5 mostra as variações entre as quatro semanas. As Figuras 6 a 11 mostram as variações interquartílicas da mediana do volume pós e pré-

tratamento com meia de gorgurão no linfedema entre as semanas avaliadas.

Tabela 1. Variações volumétricas (mL) de todos os membros avaliados durante o tratamento.

<b>Inicial</b>	<b>1<sup>a</sup> semana</b>	<b>2<sup>a</sup> semana</b>	<b>3<sup>a</sup> semana</b>	<b>4<sup>a</sup> semana</b>
4410	4013	4045	3997	4013
3456	3335	3279	3273	3248
3082	3011	3018	2995	2928
7893	6300	6429	6174	5975
3323	2972	2907	2944	3025
2971	2928	2917	2913	2857
2897	2849	2815	2773	2829
3706	3466	3427	3487	3358
3340	3080	3200	2832	2888
3151	3202	3088	3138	
3794	3681	3816	3424	3625
3016	2901	2896	2853	2807
3039	3074	3080	2979	3135
3198	3148	3246	3129	3183
5668	4757	4770	4278	4296
3622	3299	3272	3231	
3698	3652	3406	3529	3417
3819	3865	3391	3083	3255
3380	3250	3117		
3742	3770	3379	3354	3246
3888	3795	3782	3630	
4085	4216	3774	3680	3763
4342	4033	3753	3681	3872
3108	2981	2785	2829	2737
4135	3834	3708	3801	3778
3559	3405	3374	3388	3334
2941	3021	3011	3041	2914
8864	6888	6861	6738	6306
3592	3161	3095	3028	3239
2897	2689	2669	2752	2640
2813	2748	2735	2711	2713
3227	3318	3220	3227	3309
3446	3142	3246	2857	2954
3444	2955	2884	2893	2809
3369	3087	3141	3078	
3982	3891	3653	3814	3444

3177	3184	3164	3054	3056
3114	3183	3044	2952	2953
4986	4760	5326	4856	5005
4452	3403	3304	3358	3337
5693	4640	4691	4168	4035
3798	3330	3255	3179	
3527	3476	3368	3387	3388
3155	3154	2969	2793	2881
3644	3791	3267	3286	3172
3856	3896	3880	3723	
4476	4561	4013	4085	3883
5370	5227	4695	4512	4788

Tabela 2. Variações volumétricas (ml) dos 41 membros que evoluíram nas quatro semanas de tratamento.

<b>Inicial</b>	<b>1ªsemana</b>	<b>2ªsemana</b>	<b>3ªsemana</b>	<b>4ªsemana</b>
8864	6888	6861	6738	6306
7893	6300	6429	6174	5975
4986	4760	5326	4856	5005
5370	5227	4695	4512	4788
5668	4757	4770	4278	4296
5693	4640	4691	4168	4035
4410	4013	4045	3997	4013
4476	4561	4013	4085	3883
4342	4033	3753	3681	3872
4135	3834	3708	3801	3778
4085	4216	3774	3680	3763
3794	3681	3816	3424	3625
3982	3891	3653	3814	3444
3698	3652	3406	3529	3417
3527	3476	3368	3387	3388
3706	3466	3427	3487	3358
4452	3403	3304	3358	3337
3559	3405	3374	3388	3334
3227	3318	3220	3227	3309
3819	3865	3391	3083	3255
3456	3335	3279	3273	3248
3742	3770	3379	3354	3246
3592	3161	3095	3028	3239
3198	3148	3246	3129	3183
3644	3791	3267	3286	3172
3039	3074	3080	2979	3135
3177	3184	3164	3054	3056
3323	2972	2907	2944	3025

3446	3142	3246	2857	2954
3114	3183	3044	2952	2953
3082	3011	3018	2995	2928
2941	3021	3011	3041	2914
3340	3080	3200	2832	2888
3155	3154	2969	2793	2881
2971	2928	2917	2913	2857
2897	2849	2815	2773	2829
3444	2955	2884	2893	2809
3016	2901	2896	2853	2807
3108	2981	2785	2829	2737
2813	2748	2735	2711	2713
2897	2689	2669	2752	2640

Tabela 3. Número de membros que reduziram e que aumentaram de volume durante o tratamento.

<b>Normalização</b>	<b>Aumento Volume</b>	<b>Redução Volume</b>	
<b>1ª semana</b>	15 (30,61%)	34 (69,38 %)	0
<b>2ª semana</b>	5 (10,20% )	44 (89,79%)	2 (4,0%)
<b>3ª semana</b>	4 (8,63 % )	45 (91,83%)	8 (16,32%)
<b>4ª semana</b>	3 (6,12% )	46 (6,12%)	19 (38,77%)

Tabela 4. Variações das medianas de volume (ml) dos 41 dos 49 membros avaliados até a quarta semana.

	Inicial	1 <sup>a</sup> semana	2 <sup>a</sup> semana	3 <sup>a</sup> semana	4 <sup>a</sup> semana
Pernas	41	41	41	41	41
Mediana dos Volumes	3559	3403	3279	3273	3248

Tabela 5. Mostra as variações semanais da mediana dos volumes, usando-se o teste de Wilcoxon's.

Comparação	Valor <i>p</i>
Inicial vs. 4 <sup>a</sup> semana	0,0001
Inicial vs. 3 <sup>a</sup> semana	0,0001
Inicial vs. 2 <sup>a</sup> semana	0,0001
Inicial vs. 1 <sup>a</sup> semana	0,0001
1 <sup>a</sup> semana vs. 4 <sup>a</sup> semana	0,0001
1 <sup>a</sup> semana vs. 3 <sup>a</sup> semana	0,0001
2 <sup>a</sup> semana vs. 4 <sup>a</sup> semana	0,006
1 <sup>a</sup> semana vs. 2 <sup>a</sup> semana	0,002
2 <sup>a</sup> semana vs. 3 <sup>a</sup> semana	0,006
3 <sup>a</sup> semana vs. 4 <sup>a</sup> semana	0,71

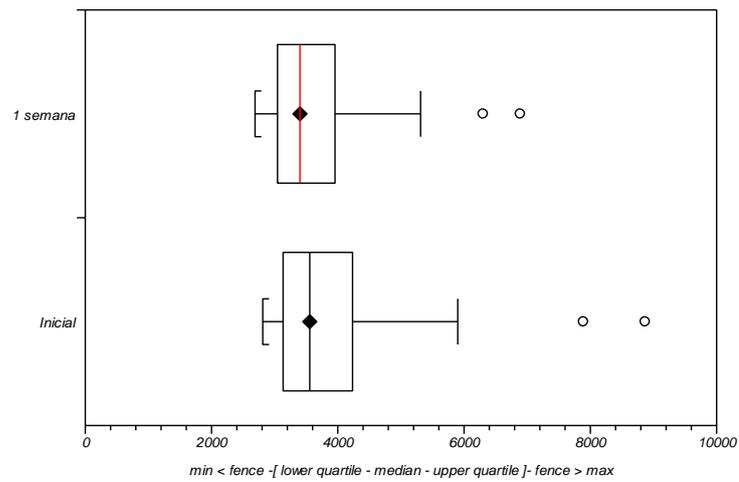


Figura 2. Box whisker plot mostra as variações interquartílica da mediana do volume pós e pré-tratamento com meia de gorgurão no linfedema de membro inferior durante primeira semana.

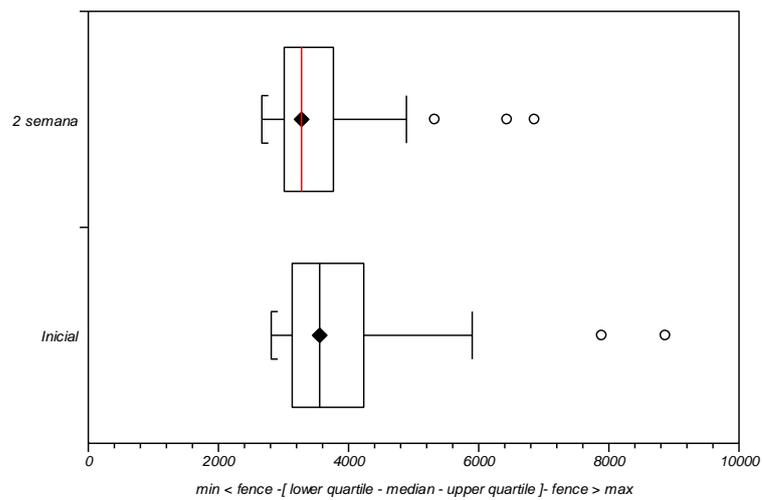


Figura 3. Box whisker plot mostra as variações interquartílica da mediana do volume pós e pré-tratamento com meia de gorgurão no linfedema entre início e segunda semana de tratamento.

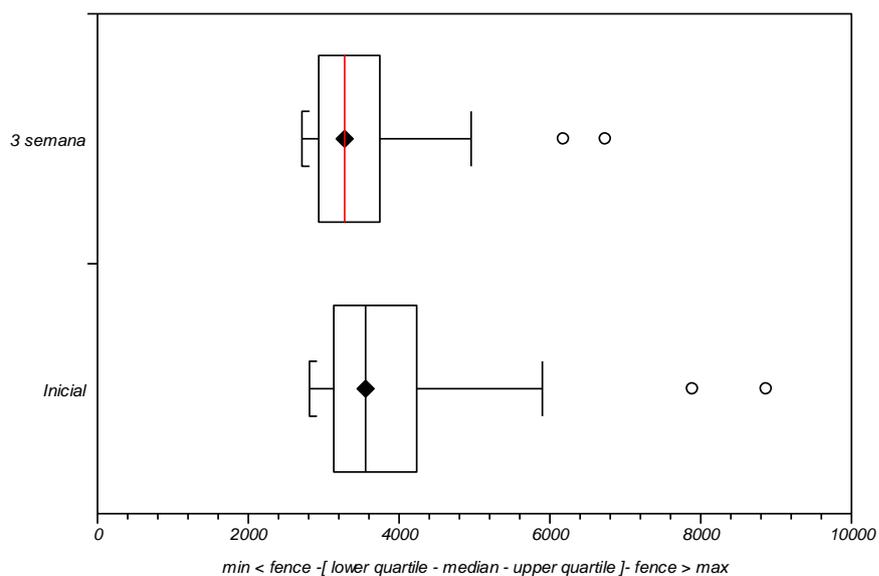


Figura 4. Box whisker plot mostra as variações interquartílica da mediana do volume pós e pré-tratamento com meia de gorgurão no linfedema entre o início e a terceira semana de tratamento.

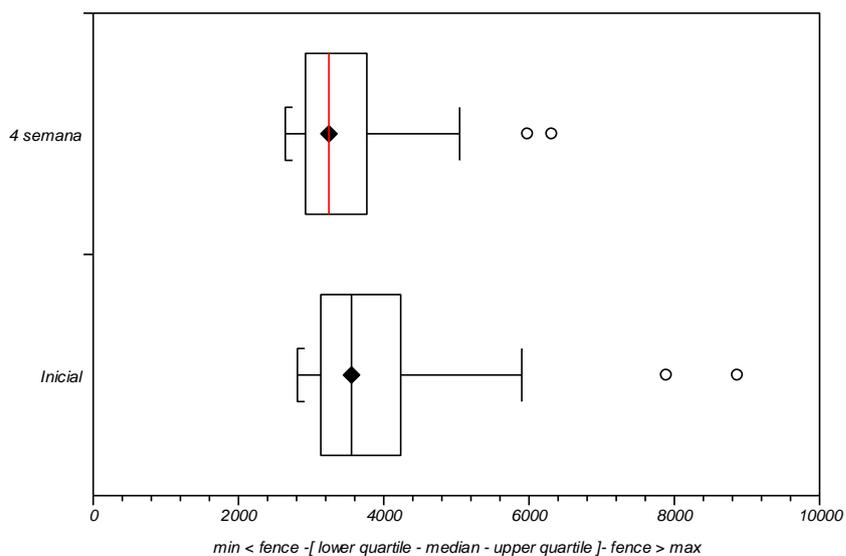


Figura 5. Box whisker plot mostra a redução volumétrica pós e pré-tratamento com meia de gorgurão no linfedema de membro inferior entre início e quarta semana de tratamento.

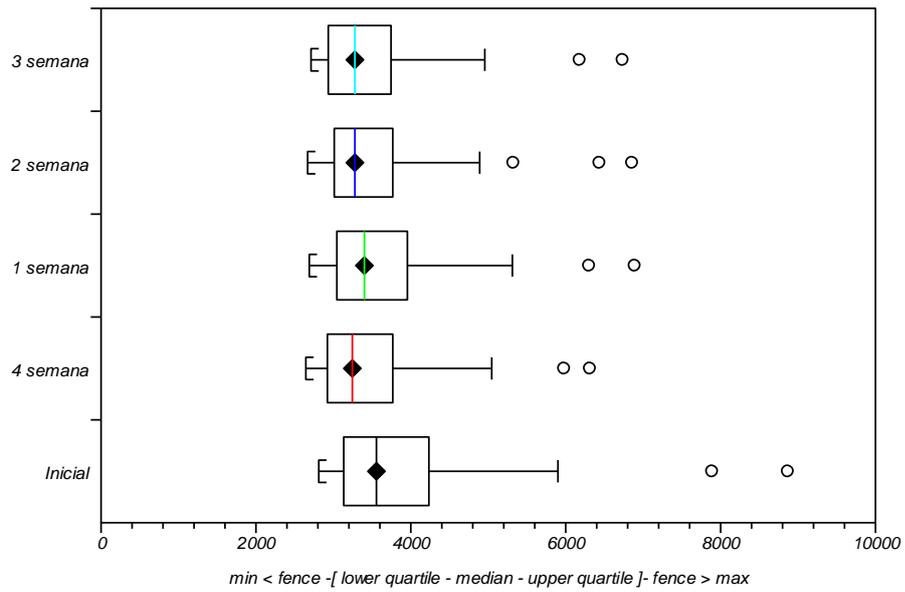


Figura 6. Box whisker plot mostra as variações interquartílica da mediana do volume pós e pré-tratamento com meia de gorgurão no linfedema durante cada semana de tratamento.

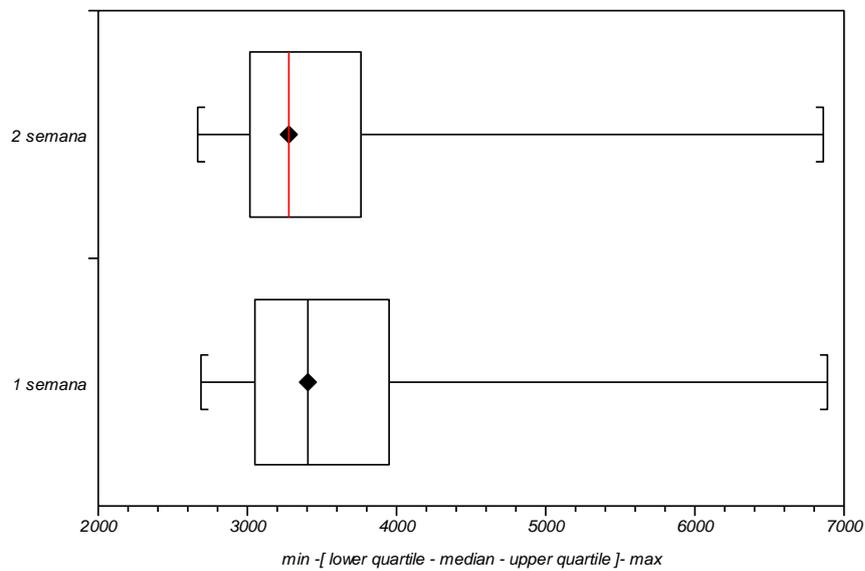


Figura 7. Box whisker plot mostra as variações interquartílica da mediana do volume pós e pré-tratamento com meia de gorgurão no linfedema entre a primeira e segunda semana de tratamento.

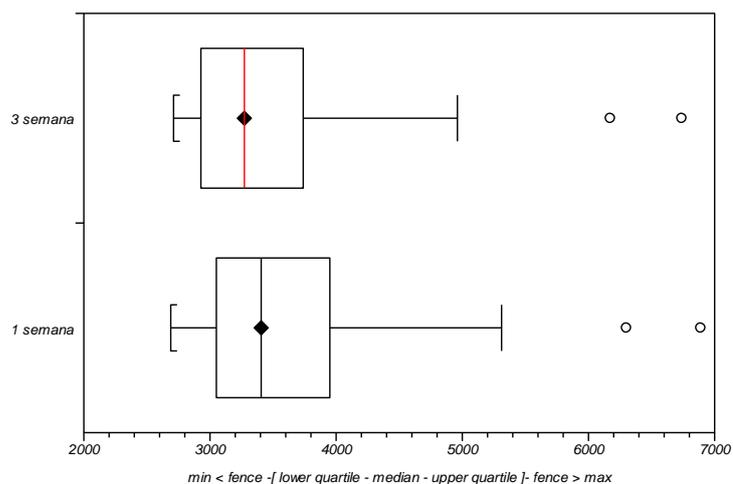


Figura 8. Box whisker plot mostra as variações interquartílica da mediana do volume pós e pré-tratamento com meia de gorgurão no linfedema entre a primeira e terceira semana de tratamento.

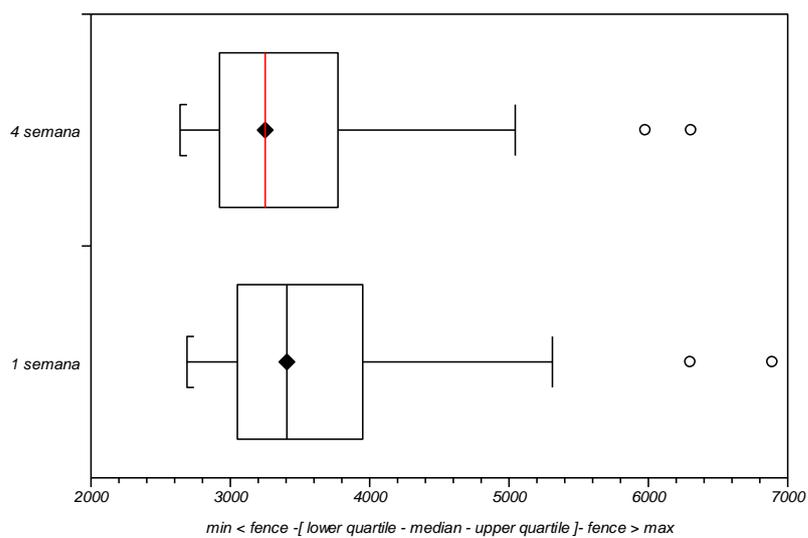


Figura 9. Box whisker plot mostra as variações interquartílica da mediana do volume pós e pré-tratamento com meia de gorgurão no linfedema entre a primeira e quarta semana de tratamento.

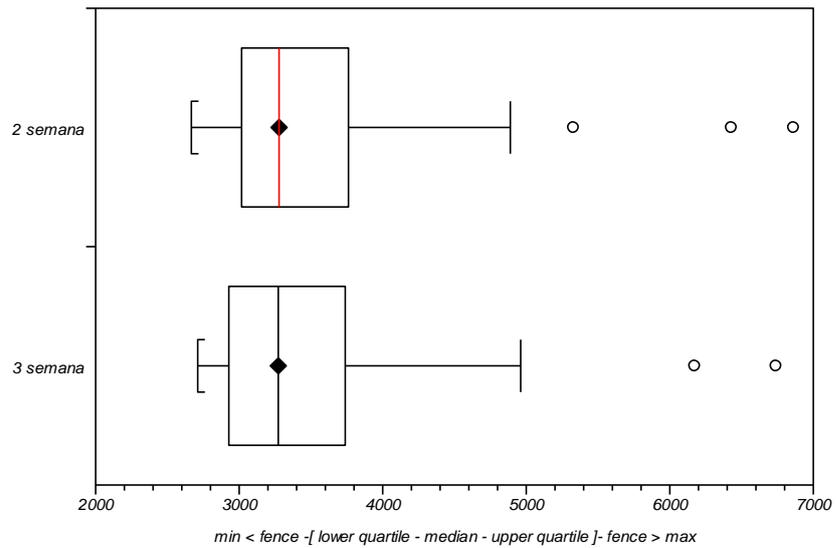


Figura 10. Box whisker plot mostra as variações interquartílica da mediana do volume pós e pré-tratamento com meia de gorgurão no linfedema entre a segunda e terceira semana de tratamento.

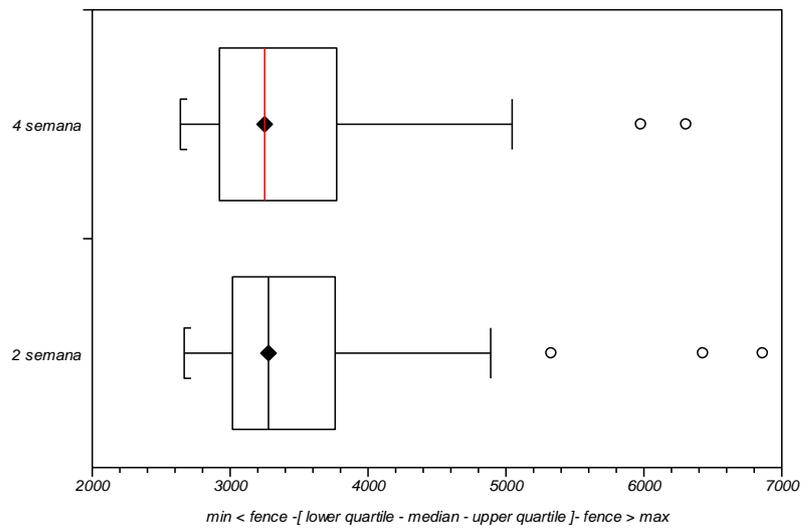


Figura 11. Box whisker plot mostra as variações interquartílica da mediana do volume pós e pré-tratamento com meia de gorgurão no linfedema entre a segunda e quarta semana de tratamento.

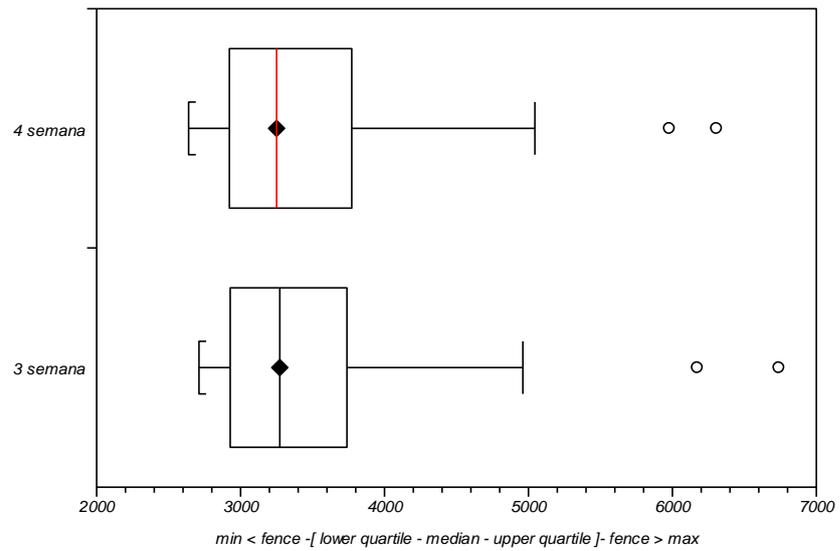


Figura 12. Box whisker plot mostra as variações interquartílica da mediana do volume pós pré-tratamento com meia de gorgurão no linfedema entre a terceira e quarta semana e tratamento.

***DISCUSSÃO***

## 4- DISCUSSÃO

O presente estudo avaliou a monoterapia no tratamento do linfedema grau II de membros inferiores, localizado abaixo do joelho, usando-se a meia de gorgurão. Pode detectar que é possível a normalização do edema no membro com essa abordagem. Este é o primeiro estudo na literatura avaliando esta meia, como monoterapia, no tratamento do linfedema de membros inferiores.

A redução de volume mais rápida relatada na literatura foi na associação de terapias que envolveram terapia linfática mecânica (Godoy & Godoy) terapia linfática manual (técnica Godoy & Godoy e meias de gorgurão). Esta associação utilizada de forma intensiva (cerca de 8 horas dia) permitiu reduzir em média 50% do volume do membro nos linfedemas grau II e III (elefantíase).<sup>(50)</sup> No presente estudo foi utilizada apenas a meia de gorgurão.

O tecido de gorgurão apresenta características importantes, aspecto que se difere das demais meias. Ele é um tecido inelástico, porém tem uma boa extensibilidade longitudinal que permite uma boa flexibilidade do membro. No sentido transversal tem uma baixa extensibilidade promovendo o uso terapêutico nas doenças linfovenosas. Além disso, ele é um tecido classificado como “canelado” fato que permite um bom ajuste no membro. Esse canelamento possibilita uma pressão de repouso quando bem ajustado. Portanto, esse tecido tem características fundamentais na compressão do linfedema. Ele pode ser usado nas grandes deformidades e tem baixo custo. O inconveniente é que necessita de ajustes constantes à medida que o membro vai reduzindo. Porém fato positivo frente à redução do edema e possibilidade de sua

utilização durante todo tratamento. Alguns casos passam de uma perimetria de 106 cm para 34 cm sem perder a meia, apenas com os ajustes necessários. <sup>(50)</sup>

A associação de terapia é sugerida quando se tem um efeito sinérgico na redução do edema. Os tipos de terapia mais empregados são drenagem linfática manual, mecanismos de contenção, exercícios e atividades linfomocinéticas e cuidados higiênicos. Entretanto, quando uma monoterapia é eficaz, pode ser sugerida como é o caso da meia de gorgorão. Contudo ela exige que seja colocada corretamente, ajustada sempre que for necessário e o paciente deve ser bem orientado sobre essa prática.

Nesse estudo foram observados dados importantes entre a redução significativa de volume que ocorreram a cada semana, exceto na terceira para quarta semana, onde 38,77% dos membros já tinham se normalizado. Porém apesar da redução ter sido significativa na primeira semana, detectou-se que 15 membros tinham aumentado de volume, porém a partir da segunda semana apenas cinco pernas mantiveram o aumento. A explicação para essa ocorrência foi a falta de experiência no uso correto da meia. Após o retorno na primeira semana e a identificação de piora do edema, os pacientes foram reorientados quanto aos cuidados no uso correto. Esta orientação permitiu que dos 15 pacientes que tinham aumento nos membros, fossem reduzidos para cinco numa semana.

A não variação do edema entre a terceira e quarta semana pode ser explicada pela importante redução do edema em quase todos os casos e a normalização de 38,77% dos membros avaliados. Portanto, sugerindo uma rápida redução do edema, em um mês. Nesse caso a maior responsabilidade do tratamento é transferida para o paciente que deve usá-la de forma correta, caso contrário não terá resultados.

Outro aspecto a ser considerado foi a seleção dos pacientes com edemas abaixo do joelho para permitir a utilização de meia tamanho 3/4 e a maior facilidade na sua colocação e remoção das meias em relação às meias calças ou 7/8. Porém de cunho educacional importante onde o paciente vai descobrir que é possível reduzir e manter o membro dentro ou próximo da normalidade. Essa responsabilidade é transmitida ao paciente onde a função da equipe terapêutica foi de ensinar e orientar quanto ao uso correto.

O linfedema não tem cura, porém podemos manter o membro dentro ou próximo aos valores de normalidade com tratamento adequado. Esse aspecto deve ser abordado com o paciente e, assim, ele fique consciente dessa realidade.

Os mecanismos de contenção constituem na principal forma terapêutica do linfedema. A meia de gorgurão vem preencher uma carência de opção de uma monoterapia eficaz no tratamento do linfedema. Alerta-se pelas dificuldades materiais eficazes e de seu acesso no tratamento do linfedema. A meia de gorgurão é eficaz e permite transferir ao paciente parte da responsabilidade no seu tratamento.

Outro aspecto tão importante como a redução do edema é a manutenção dos resultados, pois o uso contínuo dessa meia permite a redução e manutenção dos resultados. Porém, a possibilidade de flexibilidade de terapias no tratamento como a terapia linfática manual, terapia linfática mecânica, a meia elástica na fase de manutenção, estímulos cervicais (Godoy& Godoy) podem ser úteis durante a vida deste paciente. Desta forma, é fundamental que ele conheça estas opções e que utilize o melhor procedimento para no controle do edema.

Um ponto positivo dessa monoterapia é a simplicidade na sua colocação, fato que ocorre após o paciente receber as orientações, aprender a importância dos ajustes,

de seu uso contínuo, das intercorrências (dor, lesões) e a possibilidade de familiares auxiliá-lo na colocação e remoção. Assim sendo, a família pode participar na ajuda da terapia, onde poderá ter a função de auxílio, mas também de cobrança do uso correto da meia.

Avaliação de outros materiais de contenção na manutenção dos resultados e de como podem ser usados é fundamental para o paciente. Pode ter cunho educacional na sua terapia quando bem avaliado e orientado. Godoy & Godoy sugerem que a redução do edema deve ser total antes de iniciar a fase de manutenção.

Atualmente, a bandagem é outra forma de contenção mais utilizada no mundo atualmente, mas necessita de profissional experiente para colocá-la. Ao passo que a meia de gorgurão, o paciente ou a família podem colocá-la. Sugere-se que essas bandagens sejam colocadas diariamente para que elas sejam mais eficazes. A experiência com avaliação diária da meia de gorgurão por volumetria mostra claramente que quando a meia não está bem ajustada ela perde a eficácia na redução do edema, portanto, o ajuste diário das bandagens deve ser realizado.

A meia de gorgurão é ajustada como se ajusta um cadarço de sapato pelo paciente; algo simples e fácil. Entretanto, os cuidados na fase de redução são em relação à possibilidade dela traumatizar a pele. O tamanho do membro sofre contínua transformação (redução) e à medida que isso vai ocorrendo o tamanho do membro é alterado. Dessa forma pode começar a “pegar” em algumas regiões, sendo mais comum no pé e tornozelo, variações que exige ajuste. Caso contrário, poderá ferir o pé e prejudicar a evolução do tratamento. Após a normalização do edema, estas intercorrências se tornam menos frequentes. O paciente deve ser orientado quanto a

esses problemas e orientados para retirar a meia imediatamente e procurar a clínica para o seu ajuste.

No presente estudo observou-se que neste primeiro mês que apenas três dos (49) membros não tiveram redução, mesmo com as orientações semanais. Observou-se nestes pacientes, limitações em fazer o uso diário, como por exemplo, dificuldade intelectual, obesidade e da própria idade. A explicação para o aumento do edema é a possibilidade da meia estar exercendo efeito de “garrote” bloqueando a drenagem linfovenosa. Portanto, para estes dois pacientes, a forma intensiva seria a melhor opção porque teriam supervisão durante as oito horas que pudessem permanecer na clínica. Dessa forma, podendo se identificar a possível causa do aumento do edema.

A adequação da terapia a cada paciente e da própria equipe terapêutica é fundamental, porém a busca para normalizar o membro é vital.

# ***CONCLUSÕES***

## **5- CONCLUSÕES**

A meia de gorgurão como monoterapia é eficaz na redução do edema no tratamento do linfedema grau II localizado abaixo do joelho. Porém, os pacientes devem ser orientados e treinados constantemente para uso correto da meia.

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***ANEXOS***

## **Anexo 1. Parecer do Comitê de Ética em Pesquisa**



FACULDADE DE MEDICINA DE  
SÃO JOSÉ DO RIO PRETO-  
FAMERP - SP



limpa onde o paciente deve emergir um membro por vez e esperar a vazão da água até parada total, o volume do líquido poder medido por gramas ou mL. Para cada avaliação o recipiente é limpo com detergente. Esse é o padrão ouro de avaliação para edema em literatura Medline. A prescrição de meia seja de baixa elasticidade, bandagens ou meias elásticas o procedimento de orientação para qualquer incômodo ou alergia é a retirada imediata. Nesse caso o participante também terá acesso a contato telefônico com o pesquisador que deverá comunicar imediatamente e verificado. É um procedimento de rotina para o tratamento do linfedema o uso de mecanismo de contenção.

**Considerações sobre os Termos de apresentação obrigatória:**

Foram Apresentados

**Recomendações:**

Nada a Declarar

**Conclusões ou Pendências e Lista de Inadequações:**

Sem pendências

**Situação do Parecer:**

Aprovado

**Necessita Apreciação da CONEP:**

Não

**Considerações Finais a critério do CEP:**

Projeto aprovado.

SÃO JOSÉ DO RIO PRETO, 13 de Dezembro de 2012

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**Assinador por:**  
**Fernando Batigália**  
**(Coordenador)**

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**Central European Journal of Medicine**  
**Association of elastic stockings and Mechanical Lymphatic Therapy**  
–Manuscript Draft–

<b>Manuscript Number:</b>	CEJMED-D-19-00172
<b>Full Title:</b>	Association of elastic stockings and Mechanical Lymphatic Therapy
<b>Short Title:</b>	Elastic stockings in Mechanical Lymphatic Therapy
<b>Article Type:</b>	Research Article
<b>Section/Category:</b>	Vascular Surgery
<b>Keywords:</b>	Lymphedema, elastic stocking, lymph drainage, treatment
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<b>Abstract:</b>	Compression mechanisms are essential in the treatment of lymphovenous diseases as they help to reduce the swelling and to maintain the results. The objective of the current study was to evaluate the association of Mechanical Lymphatic Therapy with elastic stockings in the treatment of leg lymphedema. The daily evolution of treatment for grade II lymphedema was evaluated in a prospective clinical study. The 14 legs of seven women with bilateral edema of whatever cause were treated using the PAGEDy® Mechanical Lymphatic Therapy device and Vasosan® 2000 knee-length elastic compression stockings for two weeks. The volume of each leg was evaluated before and after each daily treatment session by bioimpedance. The study was approved by the Research Ethics Committee of the Medicine School in São José do Rio Preto (FAMERP). The paired t-test was used for statistical analysis, with an alpha error of 5% (p-value < 0.05) being considered significant. Positive and negative variations in the volume of the legs were detected compared to the previous day, but overall the treatment still reduced the volume.
<b>Suggested Reviewers:</b>	Domingo Marco Lio Bralle, MD, PhD Bralle Biomedica domingo@bralle.com.br Research
<b>Approved Reviewers:</b>	

**Anexo 2. Publicações e apresentações em congressos no período de pré-orientação e desenvolvimento da dissertação**

2.1 Apresentação trabalhos *24<sup>th</sup> International Congress of Lymphology-Rome* 16-20 September 2013

2.2 Artigos Publicados

2.3 Artigos Fase de Publicação

## **2.1 Apresentações trabalhos no 24<sup>th</sup> International Congress of Lymphology - Rome 16-20 September 2013**

1- Sinergistic Effect To Reduce Edema by Frequently Adjustment Non-Elastic Stocking. Guimarães TD, Pereira De Godoy JMP, Lopes Pinto, Barufi S, Guerreiro Godoy M De F

2- Psysical Limitations In Respect To Daily Routine Activities After The Surgical Treatment Of Breast Cancer. Guerreiro Godoy M De F, Pereira De Godoy JM, Pereira De Godoy AC, Dias Guimarães T.

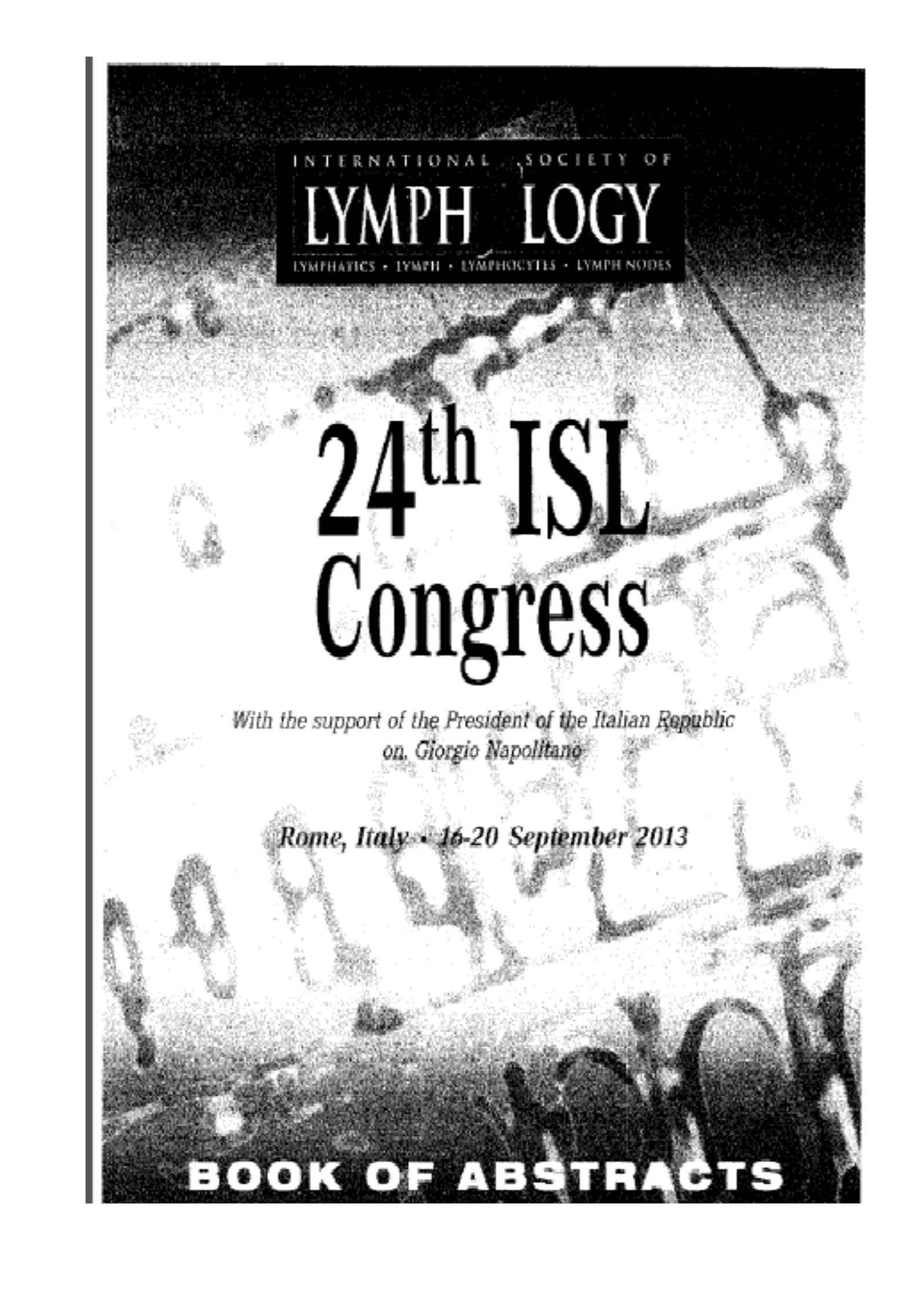
3- Intensive Treatment Of Breast Cancer Related Lymphedema In Patients With Neurological Injures. Libanore Zucchi D, Pereira De Godoy JM, Dias Guimarães T, Brigidio Amador Franco P, Guerreiro Godoy M De F.

4- Synergistic Effect Of Elastic Stocking To Mantain Volume Losses After Mechanical Lymphatic Therapy. Lopes Pinto R, Dias Guimarães T, Brigidio Amador Franco P, Guerreiro Godoy M De F, Pereira De Godoy JM.

5- Rapid Reduction Of Elephantiasis In Adolescent With Intensive Treatment. Brigidio Amador Franco P, Guerreiro Godoy M De F, Dias Guimarães T, Paludetto Lopes K, Pereira De Godoy JM.

6- Cervical Lymphatic Therapy Reduces Lymphedema Caused By The Treatment Of Laryngeal Cancer. Buzato Silva E, Pereira De Godoy JM, Dias Guimarães T, Guerreiro Godoy M De F.

7- Pain In Breast Cancer Treatment, Aggravating Factors And Coping Mechanisms. Guerreiro Godoy M De F, Pereira De Godoy JM, Barufi S, Dias Guimarães T.

The background of the cover is a high-magnification electron micrograph showing the intricate structure of a lymph node. It features a network of electron-dense membranes forming a complex, interconnected pattern, with various sized vesicles and channels visible throughout the field of view.

INTERNATIONAL SOCIETY OF  
**LYMPH LOGY**

LYMPHATICS • LYMPH • LYMPHOCYTES • LYMPH NODES

# 24<sup>th</sup> ISL Congress

*With the support of the President of the Italian Republic  
on. Giorgio Napolitano*

*Rome, Italy • 16-20 September 2013*

**BOOK OF ABSTRACTS**

## SYNERGISTIC EFFECT TO REDUCE EDEMA BY FREQUENTLY ADJUSTING NON-ELASTIC STOCKINGS

DIAS GUIMARLES T., PEREIRA DE GODOY J.M., LOPES PINTO R., BARUFI S., GUERRERO GODOY M. de F.

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The objective of the current study was to evaluate the importance of frequent adjustments of gossain (non-elastic) stockings for constant reductions in the volume of lymphoedematous limbs. Five male and ten female patients with lower limb lymphoedema of any etiology treated in the Clínica Godoy were enrolled in this study. The ages of the participants ranged from 16 to 69 years (mean: 42.5 years). Changes in edema were assessed by bioelectrical impedance. Patients were randomly allocated to one of three groups: the compression stocking was checked and adjusted every week (Group I), every fortnight (Group II) or every month (Group III). Patients with infections, limited joint mobility or allergies to the stockings were excluded. The paired t-test and one way analysis of variance with Tukey-Kramer multiple comparisons were used for statistical analysis with an alpha error of 5% (p-value < 0.05) being considered acceptable. The study was approved by the local Research Ethics Committee. A significant volume reduction was detected with weekly and fortnightly adjustments (p-value = 0.01 and 0.02, respectively) but not with monthly adjustments. Although, there was no significant difference on comparing sequential mean reductions between the three groups (the first measurement for each group), on comparing the treatment time, the reduction was greater over one month with weekly adjustments than with monthly reductions. More frequent adjustments of the stockings increases their synergistic effect in reducing edema, but stockings are more comfortable with less frequent adjustments.

## LYMPHATIC FILARIASIS RELATED LYMPHEDEMA: A SYSTEMATIC REVIEW OF INTERVENTIONS TO PREVENT OR REDUCE MORBIDITY

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Morbidity arising from infection with filariasis is a major cause of disability globally, second only to mental illness. Filariasis is still endemic in 73 countries where an estimated 1.2 million people are at risk of infection, 200 million are known to be infected and 40 million have chronic disease which is strongly associated with poverty. Chronic disease may manifest as lymphoedema (elephantiasis) or hydrocele and be associated with acute dermatolymphangioadenitis (ADLA) episodes. The current WHO guidelines for basic filarial lymphoedema management prescribe a home-based self-care routine including foot and leg hygiene, topical treatment of entry wounds, the use of footwear, limb elevation and exercises. ADLA is commonly treated with anti-inflammatories and/or antibiotics.

This review examines the evidence for the effectiveness of interventions intended to: 1) manage lymphoedema and 2) ADLA episodes, after filariasis in undeveloped countries.

The full text of 48 articles were accessed and assessed by two blinded reviewers. Articles were grouped according to the NHMRC hierarchy of evidence and level III-2 or above were included in the review. Each paper was then appraised using the appropriate CASP tool and ranked as high, moderate or low quality.

Only 8 papers were ranked as either moderate or high methodological quality. Overall there was mixed evidence for the effectiveness of a variety of drug interventions either alone or combined with self-care, or for basic self-care alone. The evidence for basic self-care alone is not strong but when combined with antibiotic and anti-inflammatory medications effectiveness in managing lymphoedema symptoms and the adverse impacts of repeated episodes of ADLA increased. This review highlights the need for further studies of the efficacy of individual components of basic self-care in relation to specific grades of lymphoedema and this will require appropriate blinding of assessors and monitoring of compliance. Based on this review, the current best recommendations for management of lymphoedema after filariasis is community based home care as described by the WHO.

## PHYSICAL LIMITATIONS IN RESPECT TO DAILY ROUTINE ACTIVITIES AFTER THE SURGICAL TREATMENT OF BREAST CANCER

GUERREIRO GODOY M. de F., PEREIRA DE GODOY L.M., PEREIRA DE GODOY A.C., DIAS OUTIMARLES T.

Godoy Clinic, Department of Rehabilitation, São José do Rio Preto, Brazil

**Aim:** The objective of this study was to evaluate physical limitations of patients with lymphedema after the surgical treatment of breast cancer to do daily routine activities.

**Method:** A group of 46 women in rehabilitation for lymphedema after the surgical treatment of breast cancer were evaluated in a randomized, cross-sectional, quantitative descriptive study in the Clínica Godoy, São José do Rio Preto. The mean age was 61.5 years. The types of surgeries performed and the numbers of chemotherapy and radiotherapy sessions were noted as were limitations in respect to dressing, eating and personal care and hygiene using a questionnaire with closed questions. Percentages were used for statistical analysis.

**Results:** A total of 52.1% of the participants had been submitted to modified radical surgeries with 94.3% being unilateral. 82.6% of the women did not reconstruct the breasts. Six to 10 sessions of chemotherapy were performed in 43.04% of the cases and over thirty sessions of radiotherapy in 71.3%. Most participants (60.86%) had difficulties to dress, 23.91% had difficulties to feed and 43.47% had difficulties for hygiene but none reported receiving guidance by professionals to carry out daily routine activities.

**Conclusion:** Lymphedema after the surgical treatment for breast cancer causes physical limitations to perform daily routine activities.

## GODOY & GODOY COMPRESSION SLEEVE IN THE TREATMENT OF ARM LYMPHEDEMA: NEW CONCEPTS OF MATERIAL

BARONI S., PEREIRA DE GODOY A.C., PEREIRA DE GODOY L.M., GUERREIRO GODOY M. de F.

Rehabilitation Medicine School of São José do Rio Preto - FAMERP and Godoy Clinic - Department Post Graduation, Brazil

The aim of this study is to report on a new low-elastic textile that fulfils the criteria of fabrics for the manufacture of compression garments used in the treatment of lymphedema. A quasi randomized prospective study was performed to evaluate the evolution of Godoy & Godoy compression sleeves during the follow up of patients treated for arm lymphedema. Sixty-six patients with ages ranging from 35 to 83 years old and a mean of 58.8 years were included in the study. Diagnosis was by clinical evaluation and confirmed by volumetry defined as a difference of > 200 ml. between arms. All the participants were submitted to treatment sessions once or twice weekly in an outpatients program. The material used for the compression sleeve is commercialized in Brazil under the name Gorgurão®. The evolution of the designs of sleeves was evaluated during the follow up of these patients. When great alterations in the pattern of sleeves were made, the patients were mentored by weekly volumetric measurements. The criterion to maintain modifications in the design was that the hand did not present with edema. By the end of the study, the design of the sleeve was changed so as not to use compression therapy of the hands in 81.8% of the cases; 12.2% continued with compression of the hand, 3.03% stopped using compression completely and 3.03% used only a glove. Godoy & Godoy compression sleeves are an efficient option for compression in the treatment of arm lymphedema as they provide greater independence in respect to day-to-day activities.

## **RAPID REDUCTION OF ELEPHANTIASIS IN AN ADOLESCENT WITH INTENSIVE TREATMENT**

**ERIGIDO AMADOR FRANCO P., GUERREIRO GODOY M. de F., DIAS GUIMARLES T., PALIETTO LOPES K., PEREIRA DE GODOY J.M.**  
*Godoy Clinic, Department of Rehabilitation, São José do Rio Preto, Brazil*

The treatment of congenital lymphedema in children is similar to treating lymphedema in adults; the technique must be adapted to the reality of each case and at each stage of the individual's life. Lymphedema in teenagers brings a series of physical and psychological disorders that can affect the quality of life. Intensive treatment has been proposed by Godoy & Godoy as the routine therapy for grade III lymphedema but this approach can be used for other grades of lymphedema. The use of intensive treatment for grade III lymphedema in a teenager has not been described in the literature before. The aim of this study is to report on the evolution and the difficulties of this approach in young people. Intensive treatment consisting of 8-hour daily sessions was proposed including Manual Lymphatic Therapy (Godoy & Godoy) Mechanical Lymphatic Therapy (MAGODOY®) and a compression mechanism (an elastic groograin stocking developed by Godoy & Godoy). The volume of the edema was reduced by 60% in the first week with further reductions in following weeks. The limiting factor in this approach is the excess of skin but this retracts with time. The intensity of treatment must be adapted to cater for the excess of skin.

## **ELEPHANTIASIS NOSTRAS VERRUCOSA IN A PATIENT WITH AND LIPEDEMA AND LIPOLYMPHEDEMA**

**PEREIRA DE GODOY J.M., FACHECO BASTOS A., GUERREIRO GODOY M. de F.**  
*Godoy Clinic, Department of Rehabilitation, São José do Rio Preto, Brazil*

Elephantiasis nostras verrucosa is a rare group of cutaneous changes comprising dermal fibrosis, hyperkeratotic, and verrucous and papillomatous lesions secondary to chronic non-filarial lymphedema. The aim of this study is to report the case with association of lipedema with elephantiasis nostras verrucosa.

## NORMAL LYMPHATICS MOTOR ACTIVITY AND ITS TREATMENT

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**Background:** The modern theory of active lymph flow is based upon intermittent lymphangions' contractility. Methods and materials. "Normal" and "in lymphedema" isolate lymphangions' motor activity of human lower extremities were investigated. It was established that lymphangions were like heart had automaticity (frequency 4 per minute) and made more contractile activity while spreading.

**Results:** Rhythmic motor activity can be initiated with electrical and mechanical stimulus, catecholamines and other endogenous regulators. Lymphangions like vessels reacts at these stimulus increasing tones and decreasing its capacity. Sympathetic nerve system runs neurogenic control principally. Noradrenaline influences on beta-adrenoreceptors decreasing frequency of autorhythmic contractilities; increasing its concentration makes rhythm more frequent by activating alpha-adrenoreceptors. Local regulating activity realized by means of tissue hormones with mastocytes. Serotonin increases but heparin decreases phase and tonic reactions of lymphangions. Histamine in low concentration stimulates but in high concentration – stops motor activity.

**Discussion:** There is an initial stage in lymphedema pathogenesis when lymphangions contractile activity have intact structure but change its reactivity to endogenous regulators due to oncolymphatic pressure. So it leads to incompetence of lymphatic pump activity and edema. Beginning conservative treatment at this stage lets to save lymphangions contractile activity and prevent further lymphedema progression. There are some effective methods at this stage like electro-stimulation, pneumatic compression and other methods decreasing oncolymphatic pressure. Sethaseril, adrenoagarizol, phlebtonics, interleukin-2 increases phase rhythmic contractility and pump activity of isolated human lymphangions. Also this kind of drugs are effective in lymphedema treatment.

## CERVICAL LYMPHATIC THERAPY REDUCES LYMPHEDEMA CAUSED BY THE TREATMENT OF LARYNGEAL CANCER

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The case of a 62-year-old patient is reported. Two years previously this patient had felt a strong sore throat after eating ice cream. Soon after, an outbreak of herpes zoster appeared which was treated with medications, but the pain continued and the patient was referred to an otolaryngologist who made an ultrasound and found a nodule in the larynx. The patient was referred to an oncologist who diagnosed laryngeal cancer. The patient was submitted to chemotherapy (11 sessions) and radiotherapy (40 sessions). After treatment, the patient complained of neck pain, difficulty in swallowing, decreased saliva production, difficulty in sleeping and hoarseness. The patient was then referred to the Clinica Godoy for treatment of the edema where Cervical Lymphatic Therapy – cervical stimulus as described by Godoy & Godoy was performed. This technique consists of light stimulation of the cervical region for a period of 20 minutes five times per week. A marked improvement was observed in the first few days with the voice and swallowing of solids returning to normal. The aim of this study is to describe the use of Godoy & Godoy Cervical Lymphatic Therapy to improve the clinical signs and symptoms after laryngeal cancer treatment.

## PAIN IN BREAST CANCER TREATMENT, AGGRAVATING FACTORS AND COPING MECHANISMS

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The objective of this study was to evaluate pain in women with breast cancer-related lymphedema and the characteristic aggravating factors and coping mechanisms. The study was conducted in the Clínica Godoy, São José do Rio Preto, with a group of 46 women who had undergone surgery for the treatment of breast cancer between 6 months to 10 years previously. This was an observational, quantitative, random study. The following variables were evaluated: type and length of surgery; number of radiotherapy and chemotherapy sessions; continued feeling of the removed breast; infection; pain (at site of removed breast or isolated); intensity of pain and factors that improve and worsen the pain. The percentage of events was used for statistical analysis. About half the participants (52.1%) performed modified radical surgery, with 91.3% removing only one breast; 92.6% of the participants did not perform breast reconstruction surgery. Most women (63.04%) were submitted to from 6 to 10 chemotherapy sessions and 71.3% had more than thirty sessions of radiotherapy. The body mass index was more than 25 in 63.4% of the cases. Insignificant pain was reported by 32.60% of the women and 67.3% said they suffered pain; it was mild in 28.8% of the cases (1-5 scale), moderate in 34.8% (6-9 scale) and severe in 4.3%. The main mechanisms used to cope with pain were painkillers in 41.30% of participants, rest in 21.73%, religious ceremonies in 17.39% and to chat with friends in 8.69%. A total of 53.17% of the women had completed high school; 58.7% were married, 21.37% were separated and 19.6% were widowed. In respect to occupation, 21.73% worked, 30.43% were on sick leave or unemployed and 47.82% were retired. In conclusion, many mastectomized patients with lymphedema complain of pain, but pain is often underrecognized and undertreated.

## GENITAL DERMAL BACKFLOW (GDB) STAGE BASED ON THE CONCEPT OF LOWER-ABDOMEN-TO-GENITALIA SEQUENCE: INDOCYANINE GREEN LYMPHOGRAPHY FOR PATHOPHYSIOLOGICAL EVALUATION AND EARLY DIAGNOSIS OF GENITAL LYMPHEDEMA

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**Background:** Treatment of genital lymphedema (GL) is challenging, and early diagnosis and intervention is important to prevent progression of GL. However, early treatment of GL is difficult due to a lack of appropriate evaluation methods allowing early diagnosis. This study aimed to develop a novel pathophysiological evaluation method for early diagnosis of GL using indocyanine green (ICG) lymphography.

**Methods:** Patient characteristics and ICG lymphography findings of 68 secondary leg lymphedema patients were reviewed. The clinical data and dermal backflow (DB) stages based on ICG lymphography findings, leg DB (LDB) stage for leg lymphedema and genital DB (GDB) stage for genital lymphedema, were analyzed to compare between the left and right region with and without symptomatic GL.

**Results:** Twenty-two of 136 lateralitys had symptomatic GL. Univariate analyses revealed statistically significant differences between lateralitys with and without GL in duration of leg edema ( $6.3 \pm 1.1$  vs.  $3.8 \pm 0.5$  years), International Society of Lymphology stage (stage 0/1/2/3: 0/4/15/2 vs. 40/32/32/10), LDB stage (stage 0/1/II/III/IV/V: 0/0/7/0/4/2 vs. 6/35/13/29/18/3), and GDB stage (stage 0/1/II/III/IV: 0/0/0/20/2 vs. 27/43/28/16/0).

**Conclusions:** ICG lymphography can clearly visualize abnormal lymph circulation in the lower abdominal and genital region. GDB stage is based on the concept of lower abdomen-to-genitalia (LAG) sequence, in which genital lymphedema follows lower abdominal lymphedema, allows early diagnosis of GL before symptom manifestation. ICG genital lymphography can be a key evaluation for prevention and early intervention of GL.

## PREOPERATIVE PREPARATION FOR THE THIRD HIP REPLACEMENT SURGERY OF A PATIENT WITH GRADE II LEG LYMPHEDEMA

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The objective of this study is to report on intensive treatment to reduce the volume of a lymphoedematous leg in the preoperative preparation for a third hip replacement surgery. The patient, with grade II leg lymphoedema, was treated using Mechanical Lymphatic Therapy and Manual Lymphatic Therapy associated with a gossain compression stocking. The case of a 75-year-old patient is reported. The patient, with leg lymphoedema, arrived at the Clínica Godoy for treatment in June 2012. At 45 years old (1967), the patient complaining of pain in the left hip had been to an orthopedic surgeon who indicated hip replacement surgery. One year later the patient performed the same surgery in his right leg. At this time, slight edema of the ankles in particular of the left leg was noted.

At the age of 68 years old (2005) the patient replaced the left hip prosthesis. In 2011, the edema had spread to the entire left leg, and the joint pain had increased in intensity, using the Analog Pain Scale of 0-10, the patient reported that, on-and-off, it increased to 8. He returned to the orthopedist who indicated a third left hip surgery to replace the prosthesis, however he recommended treatment of the edema by a vascular specialist prior to surgery. The patient was diagnosed as having lymphoedema of both legs in the Clínica Godoy. He was evaluated by bioelectrical impedance, which calculated volumes of 5.52 and 7.24 liters for his right and left legs, respectively.

Five consecutive days of intensive treatment was proposed including Mechanical Lymphatic Therapy (RAGodoy®) for 8 hours/day and a gossain compression stocking for 24 hours/day with adjustments in size every day. By Day 5, the patient had a significant improvement in the volume of both right (4.45 liters) and left legs (5.57 liters). Monitoring was by routine assessments and guidance about the use of the gossain socking and walking to maintain the results. After total reduction of the edema, the patient was submitted to surgery to replace the prosthesis.

## ENDOLYMPHATIC HEMOSTATIC THERAPY OF ACUTE GASTRO-DUODENAL EROSIVE HEMORRHAGE OCCURRING ON THE BACKGROUND OF CARDIOVASCULAR DISEASE

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**Introduction:** Increasing the degree of cardiovascular disease severity in recent years has led to an increase of acute gastric mucosal ulcers and duodenal ulcers, and consequently an increase of their hemorrhagic. These hemorrhages are often quite intense and existing methods of emergency gastrointestinal hemorrhage of non-ulcer nature do not always satisfy physicians. Their mortality of such category of patients having the above type of hemorrhage may reach 6,5-11,5%. The most important in the outcome of the disease is the possibility to prevent hemorrhage backset by reaching maximum stable hemostasis. In particular in 35% of cases of hemorrhage backset mortality was about 12-15% among patients having hemorrhagic erosive gastritis.

**Objective:** Improving the efficiency of treatment gastro-duodenal hemorrhage which occurs on the background of cardiovascular disease with the help of using endolympatic hemostatic therapy based on the monocyte-macrophage mechanism of hemocoagulation. Interrupted monocyte-macrophage hemostasis occurs in case of acute gastro-duodenal erosive hemorrhage that developed on the cardiovascular disease background. This results in a decrease of hemostatic potential of monocytes, macrophages and lymphocytes in the lymph bed. The endolympatic administration hemostatic agents is needed in this case to effect control over hemorrhage from acute peptic ulcer and to realize hemorrhage backset secondary prophylaxis. The advantage of this method is based on the fact that by introducing the endolympatic hemostatic substances hemostatic potential in monocytes, macrophages and lymphocytes is enhanced up to clinically significant values and this potential is delivered by these cells to hemorrhage focus. Hemostatic implementation occurs directly in hemorrhage focus under the influence of the factors involved in the activation and running the monocyte-macrophage mechanism of hemocoagulation. Actually we witness stable blood coagulability outside the focus of tissue destruction that does not affect its rheological properties while applying the above technique. This circumstance allows to reduce the risk of complications connected with a hypercoagulable state and more efficiently and over-dynamically use the whole spectrum of hemostatic drugs and techniques. The proposed method of intralymphatic therapy can improve the results of treatment of patients suffering from acute gastro-duodenal hemorrhage from stomach ulcer and duodenum mucous membrane, improve treatment period, reduce the number of complications connected with hypercoagulability, reduce mortality rate.

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Breast J. 2013 May-Jun;19(3):349-50. doi: 10.1111/bj.12115. Epub 2013 Apr 18.

## Phantom breast syndrome in women after mastectomy.

Guerreiro Godoy Mde F., Pereira de Godoy AC., de Matos MJ., Guimarães ID., Barufi S.

PMID: 23600683 [PubMed - indexed for MEDLINE]

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## LETTER TO THE EDITOR

# Phantom Breast Syndrome in Women after Mastectomy

To the Editor:

The phenomenon of phantom pain was first associated to amputation of injured limbs during the war (1). Individuals who had lost a limb consistently reported a feeling that it still existed, associated in some cases, to severe pain. This type of feeling appears to be common after mastectomies and is often accompanied by other psychological symptoms; even so these syndromes are often underdiagnosed (2). The phantom symptoms can present as a persistent feeling of heaviness, itching or tingling called phantom breast sensation, or just pain, known as phantom breast pain; both can occur in all or part of the phantom breast (3). The pathophysiology of phantom breast pain is not fully understood and it is less studied than phantom limb pain (4). Some studies report a frequency of phantom breast pain ranging from 7 to 17.4% (5,6). On the other hand it is essential to differentiate between phantom pain and chronic pain which is quite commonly felt by women after mastectomies, especially with conservative surgery. Moreover, mastectomy for many women is a stigma of mutilation that is associated with psychological symptoms and severe phantom breast pain is referred to as a symptom of these changes. The aim of this study was to evaluate the presence of phantom breast syndrome and report symptoms such as pain and its intensity, manner of coping, the search for physical and psychological treatment, as well as socio-demographic aspects of mastectomized women.

This was a retrospective observational quantitative cohort study of 46 women submitted to breast cancer surgery. The surgeries were performed between 6 months and 10 years prior to this study with a mean time of 6.64 years. The ages of the participants ranged from 43 to 89 years old with a mean of 61.5 years. The study was carried out at the Clínica Godoy, São José do Rio Preto in the period from

September to December 2009. All women being treated for axillary dissection were invited to participate in the study in the order of arrival at the clinic. All patients who agreed to participate in the study signed informed consent forms. The evaluation was by a specific questionnaire designed for the study with closed questions which included a continued feeling of the presence of the breast, the type of surgery, number of sessions of radiotherapy and chemotherapy and their participation in any kind of physical and psychological treatment after surgery. Percentages, means and medians for age were used for statistical analysis. The study was approved by the Research Ethics Committee of FAMERP (protocol 3723/2009).

In 52.1% of the cases, modified radical surgery was performed; for 91.3% mastectomy was unilateral and for 8.6% bilateral. Only 17.4% reconstructed their breasts with the reconstruction surgery conducted more than 19 months after the mastectomy for 73.0% of the women.

From 6 to 10 sessions of chemotherapy was used in 63.0% of patients and 71.3% were submitted to more than 30 sessions of radiation therapy. Body mass index was more than 25 in 63.4% of the women.

Phantom breast sensation was reported by 47.8% of patients; it appeared immediately after surgery for 15.2%, from 1 to 3 months after mastectomy for 15.2% and after 3 months for 17.4%. The symptoms began to disappear after 12 months for 13.2%, between 12 and 24 months for 11.0%, between 24 months and 5 years for 17.6% and after 5 years for 6.6%. The sensation is rarely reported more than 5 years after surgery.

Phantom breast syndrome is not well understood and its pathophysiology is less studied than phantom phenomena in limb amputations, perhaps because it appears to be associated with a set of symptoms that makes it difficult to describe (7). The syndrome involves pain at the site of the mastectomy alone or a simultaneous sensation of the presence of the breast while with sensation pain, tingling or heaviness are reported in isolation. One difference is that phantom breast syndrome occurs immediately after surgery and

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## Control of lymphedema using a cotton-polyester stocking in a patient with a mental disability

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### Abstract

The objective of this study is to report on the treatment of lymphedema in a mentally handicapped individual using an inelastic stocking made of a cotton-polyester textile. This 23-year-old mentally handicapped male had suffered from bilateral congenital lymphedema of the legs since the age of seven years old. The edema was most pronounced three years ago, but the patient was not submitted to treatment. On physical examination, swelling was observed from the back of the feet up to the region of the knees; the Stemmer sign was positive. The patient was referred to Clínica Godoy for specialist treatment which included counseling for the family on the importance of hygiene of skin wounds to prevent infection and the use of a low-stretch compression stocking made from a cotton-polyester textile. The patient's adherence to treatment was achieved with the help of relatives and the edema was reduced. Special strategies are required to guarantee the successful treatment of lymphedema in mentally handicapped patients. A key feature in this therapeutic approach is a compression mechanism that gives independence to the patient as the garment can be dressed and undressed without professional assistance.

**Keywords:** lymphedema, mentally handicapped, compression

### Introduction

Disability is defined as a loss or abnormality of structure or function of psychological, physiological or anatomical structures, which can be congenital or acquired, permanent or temporary (1). Changes in mental health have placed those with mental illness and their families as protagonists in a process that seeks to innovate the forms of care; this process counts on a partnership with mental health professionals. Increased assistance has improved the quality of life these individuals but they may have associated diseases, including lymphedema, which should also be treated.

Lymphedema is a chronic disease, defined as the abnormal accumulation of protein-rich fluid in soft tissues resulting from dysfunction of the lymphatic system, an imbalance between the formation of lymph and its absorption in the initial lymphatics (2). Despite the chronicity, when treated, the volume of limbs can be kept within the normal size range. The recommended

management of this disease is a combination of therapies including manual and mechanical lymph drainage, compression, myolymphokinetic exercises and activities, hygiene and preventive measures against infection (3). However, for individuals with mental disabilities there is a difficulty in maintaining an association of therapies due to the lack of self care and often a lack of care by the family too.

The aim of this study is to report on the evolution of lymphedema in a mentally handicapped patient using a low-stretch stocking made of a cotton-polyester textile.

### Case Report

We report on a 23-year-old mentally handicapped male patient with bilateral congenital lymphedema of the lower limbs. Lower limb edema was observed from the age of seven however it has been progressively getting worse in particular over the last three years. The patient was not submitted to treatment during this period. His caregiver

## The Godoy & Godoy cervical stimulation technique in the treatment of primary congenital lymphedema

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### Abstract

The aim of the current study is to report on the treatment of primary lymphedema using a new form of therapy: cervical stimulation. In a prospective cohort study, 3 boys and 5 girls with primary congenital lymphedema were evaluated over two years. Age ranged from two months to 8.5 years. After diagnosis, all mothers were trained in the new technique. The Godoy & Godoy cervical stimulation technique consists of between 20 to 30 stimuli per minute using light movements in the cervical region. All the children were submitted to perimetric evaluations of the feet and legs; however, in this study only leg points, 3 and 6 cm from the base of the big toe nail, were used. The two-tailed *t*-test was used for statistical analysis with an alpha error of 5% ( $P < 0.05$ ) considered acceptable. The aim of the lymphoedematous feet was reduced and even normalized ( $P < 0.001$ ) for all treated children. Cervical stimulation is a new option in the treatment of primary congenital lymphedema; its association with compression stockings has a synergistic effect in reducing the volume of lymphedema.

### Introduction

Lymphedema, defined as the abnormal accumulation of protein-rich fluid in soft tissue, is a result of dysfunction of the lymphatic system that causes an imbalance between lymph formation and its absorption into the initial lymphatics.<sup>1,2</sup> Another definition is a progressive, but usually painless, swelling of the limbs or genitalia that is the result of a decrease in transport capacity of the lymphatic system.<sup>3</sup> Lymphedema in children is rare with a reported prevalence of approximately 1.15/100,000 in those under 20 years of age.<sup>4</sup> Another study of 212 index patients with pri-

mary lymphedema under the age of 20 years reported a frequency of 1:880 at birth in a ratio of one male to three females.<sup>5</sup>

Intra-familial clinical heterogeneity has been reported, as has variability in age at onset. There are at least three fairly genetically distinct lymphedema conditions and mutations of these genes have been discovered in families with congenital lymphedema.<sup>6</sup> Lymphedema of the lower extremities is a diagnostic challenge with the first step being the exclusion of secondary causes of swelling and secondary lymphedema. The majority of cases of primary lymphedema are due to inborn abnormalities of the lymphatic system.<sup>7</sup> Primary lymphedema is classified as sporadic/non-familial versus familial lymphedema in one group of congenital defects. Findings support the recommendation that a further careful and comprehensive clinical evaluation is warranted, including a detailed investigation of dysmorphic features together with imaging of the lymphatic system with a subsequent syndromic classification when peripheral lymphedema of undetermined etiology is found.<sup>8</sup> In long-lasting lymphedema, essential accumulation of proteins, inflammatory cells, adipose tissue hypertrophy and fibrosis make pitting less evident.<sup>9</sup> In primary congenital lymphedema, treatment focuses on non-surgical options, such as manual lymph drainage, compression therapy and exercises closely involving parents. However, few studies report the evolution in the role of patients with respect to the different forms of treatment given. The aim of the current study is to report on the results of the treatment of primary congenital lymphedema over a period of two years using a new form of treatment.

### Case Report

Fourteen children (3 boys and 5 girls) with primary congenital lymphedema were evaluated in a prospective cohort study carried out from 2004 to 2009 in the Godoy Clinic, Brazil. Age at start of treatment ranged from two months to 8.5 years. Inclusion criteria was the presence of clinically diagnosed lymphedema of a lower extremity confirmed by perimetric measurements at two points, 3 and 6 cm from the base of the big toe along the dorsum of the feet. Four children were excluded from the study because they were unable to periodically return for treatment due to the distance from their homes to the treatment center. After diagnosis, all the mothers were trained in the manual cervical stimulation technique and<sup>10</sup> when considered sufficiently proficient, they were given permission by the therapeutic team to continue treatment in their own homes. Mothers

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Key words: lymphedema, congenital, treatment.

Conflict of interests: the authors report no potential conflict of interests.

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were requested to perform stimulation for 15 to 20 min per day at 20 to 30 stimuli per minute using light movements.<sup>10-11</sup> For some children, a home-made compression stocking made of a cotton-polyester material was used. Adjustments were made to the size of the compression stocking as the volume of edema was reduced.<sup>12</sup> All the children were submitted to perimetric evaluations of the feet and legs, although for this study, only measurements of the feet at two points, 3 and 6 cm from the base of the big toe along the dorsum of the feet, were used. The edema was evaluated at all clinic visits. Mothers were encouraged to take part in these evaluation sessions so that they participated more in the treatment of their child. Low-stretch cotton-polyester compression stockings were used in the treatment of 4 children. The two-tailed *t*-test and Wilcoxon's matched-pair test were used for statistical analysis with an alpha error of 5% ( $P < 0.05$ ) considered acceptable. The study was approved by the Research Ethics Committee of the School of Medicine in São João do Rio Preto (FAMERP protocol n. 1902008). After the nature of the study had been explained, the parents or guardians of the children signed informed written consent forms.

### Results

At the start of treatment, perimetry revealed a statistically significant difference between the feet affected by lymphedema and those not affected in 10 children (paired *t*-test  $P < 0.001$ ) (Table 1). After two years of treatment there was least of a difference, but this

## Artigo Original

# Avaliação volumétrica após tratamento com RAGodoy® em pacientes com linfedema de membros inferiores

## Volumetric evaluation after treatment using the RAGodoy® apparatus in patients with lower limb lymphedema

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**Resumo** O objetivo do presente estudo foi avaliar, através da técnica de volumetria, a eficiência do dispositivo RAGodoy® no tratamento do linfedema de membros inferiores. Foram tratados 13 pacientes com linfedema dos membros inferiores, sendo sete mulheres e seis homens, com idades entre 24 a 46 anos, na clínica Godoy. Todos os pacientes foram avaliados por volumetria (técnica de deslocamento de água) antes e logo após uma hora de drenagem linfática mecânica utilizando o dispositivo RAGodoy®. Para análise estatística foi utilizado o teste t. O estudo foi aprovado na comissão de ética em pesquisa da Faculdade de Medicina de São José do Rio Preto. A redução de volume no membro inferior com linfedema, após uma hora de drenagem linfática mecânica, apresentou significância estatística ( $p < 0,001$ ), com média de redução volumétrica de 116 ml. Não houve intercorrência durante o tratamento. Podemos concluir que o dispositivo RAGodoy® é um equipamento eficaz para promover a drenagem linfática de membros inferiores linfedematosos, reduzindo significativamente seu volume.

**Palavras-chave** Linfedema, drenagem linfática, tratamento.

**Abstract** The aim of the current study is to evaluate the volumetric reduction using the RAGodoy® apparatus for patients with leg lymphedema. Seven female and six male patients (13) aged between 24 and 46 years with leg lymphedema were evaluated in the Godoy Clinic. All patients' legs were evaluated using the water displacement volumetry technique just before and after one-hour session with the RAGodoy® apparatus. The paired t-test was used for statistical analysis and the study was approved by the local Research Ethics Committee. The reduction in volume after the one-hour session was significant ( $p$ -value  $< 0.001$ ) with an average reduction of 116 mL. There was no complication in the treatment. The conclusion is that RAGodoy® apparatus is effective in reducing the volume in lymphedematous lower limbs.

**Keywords** lymphedema, lymphatic drainage, treatment.

### Introdução:

O linfedema é caracterizado por ser tipo de edema decorrente do acúmulo anormal de líquidos e substâncias nos tecidos, resultantes da falha no sistema linfático de drenagem<sup>(1,2)</sup>.

No tratamento do linfedema é recomendada a associação de terapias<sup>(1,3)</sup> como a drenagem linfática<sup>(4,5)</sup>, exercícios linfomiméticos<sup>(6,7)</sup>, meios e bandagens<sup>(8,9)</sup>, cuidados higiênicos e cuidados de vida diária<sup>(10)</sup>, apoio psicológico<sup>(11)</sup> e drogas linfocinéticas<sup>(12)</sup>. Entretanto há poucos dispositivos citados na literatura para realização da drenagem linfática mecânica como a pressoterapia<sup>(13)</sup> e, mais recentemente, o RAGodoy<sup>(14,15)</sup>.

### Objetivo:

O objetivo do presente estudo foi avaliar a redução volumétrica de membros inferiores com linfedema antes e após a utilização do dispositivo de drenagem linfática mecânica RAGodoy®.

### Método:

Foi realizado estudo prospectivo, quantitativo e randomizado. Foram testados, na Clínica Godoy, 13 pacientes com linfedema dos membros inferiores, sendo sete mulheres e seis homens, com idades entre 24 a 46 anos. Todos os pacientes estavam em tratamento clínico, sendo 12 portadores de linfedema grau II e

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Não há conflito de interesse

## Synergistic Effect of low elastic compression sleeves in the treatment of lymphedema after breast cancer treatment

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### Abstract

The aim of this study was to evaluate the reduction in volume of lymphedematous arms using an association of low elastic compression and active exercises controlled using a facilitating device. Eighteen female patients with arm lymphedema resulting from the treatment of breast cancer (surgical, chemotherapy and radiotherapy) were randomly included in a rehabilitation group. The mean age of the women was 57.8 years old. The participants were submitted to two one-hour sessions of active exercises, one while using a low elastic compression sleeve and the other without compression. The active exercise session associated with compression therapy significantly reduced the volume of the lymphedematous limb (p-value = 0.001) but no significant change was observed without compression (p-value = 0.6).

Low elastic compression has a synergistic effect with controlled active exercises in reducing the volume of lymphedematous arms.

**Key words:** compression, exercises, device, synergistic effect

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### Introduction

Lymphedema is characterized as the abnormal accumulation of protein-rich fluid in the tissues resulting from dysfunction of the lymphatic system causing an imbalance between lymph formation and absorption by the initial lymphatics.

It is one of the diseases that most leads to disability from work in the world, however there are very few clinical studies that guide and support treatment.

It is known that one of the main complications of breast cancer treatment is lymphedema and that this affects hundreds of women throughout Brazil. The World Health Organization estimates that there are more than 1,050,000 new cases of breast cancer worldwide each year, making it the most common type of cancer among women<sup>1</sup>.

The estimated number of new cases of breast cancer in Brazil for 2019 is expected to be 49,240 with an estimated risk of 49 cases per 100,000 women, in the

southeastern region of the country breast cancer is more common than the national average with an estimated risk of 65 new cases per 100,000 women<sup>1</sup>. A high prevalence of lymphedema has been reported in cancer patients; the rate can be as high as 90% when the patient is submitted to axillary lymph node dissection<sup>2</sup>.

An association of therapies, including manual and mechanical lymphatic drainage<sup>3,4</sup>, bandaging<sup>5,6,7</sup>, personal hygiene precautions<sup>8</sup>, exercising<sup>9,10</sup>, myolymphokinetic activities<sup>11,12</sup> and drug therapy<sup>13</sup> is recommended in the treatment of lymphedema. Thus, one area of lymphedema that has been researched very little is what exercises should be indicated in treatment programs. One of the few studies on this issue showed that the lymphoscintigraphic pattern of arm lymphedema improves with exercising<sup>14</sup>. Other studies have shown that a program of moderately intense exercises after the surgical treatment of breast cancer reduce fatigue and improve the quality of life of patients<sup>15,16</sup>.

## Exercises using leisure resources to reduce arm lymphedema

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### Abstract

The aim of this study was to evaluate a form of programmed exercises in the recumbent position using leisure resources.

Ten female patients aged between 42 and 72 years old (mean age of 66 years) referred for an evaluation of lymphedema were enrolled in this study. Inclusion criteria were a history of treatment for cancer leading to arm edema evidenced as a difference in volume greater than 200 mL compared to the contralateral limb. Women with active infections, skin lesions or active disease were excluded from the study. Four types of exercises were selected including using a ball, a bat for arm lifting movements, flexion and extension movements of the arm and flexion and extension movements with the arm supported on a foam wedge. These exercises were performed as four 15-minute stints over one hour. All participants were supervised during activities and warned to perform few movements (maximum 10 per minute) in the supine position and to use a compression arm sleeve. Changes in volume were calculated using plethysmography before the start and after completing the exercises. The paired t-test was used for statistical analysis with an alpha error of 5% being considered acceptable (p-value < 0.05).

For the group as a whole, the change in volume of the lymphoedematous arms was insignificant; for seven patients the volume increased and for three it diminished.

The types of exercises used in this study did not reduce the volume of lymphoedematous arms.

**Keywords:** Myolymphokinetic exercises, lymphedema, upper limb, treatment

### Introduction

Lymphedema is characterized by a type of edema caused by the abnormal accumulation of fluid and other substances in tissues resulting from a failure of the lymphatic drainage system, together with insufficient extralymphatic proteolysis of the cell interstitium<sup>[1]</sup> and mobilization of macromolecules<sup>[2]</sup>.

Lymphedema can cause a high degree of dysfunction including decreased joint mobility with a reduced range of movement due, in part, to the weight of the limb and pain causing difficulty or even inability to perform daily

tasks. Additionally, the psychological condition of the patient is impaired from the moment of breaking the news about the disease, throughout treatment and after due to the sequelae that follow treatment. Mastectomized patients require multidisciplinary care in both the prevention and treatment of sequelae.

There is a consensus that there is no single method of treating lymphedema instead a combination of therapies is recommended<sup>[3,4]</sup>. Treatment should include some or all of the following: lymphatic drainage<sup>[5-7]</sup>, myolymphokinetic exercises<sup>[8-10]</sup>, use of compression

## Bioimpedance assessment of edema in patients with mastectomy-related lymphedema treated by mechanical lymph drainage using the RAGodoy® device

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### Abstract

Few apparatuses have been developed for the treatment of arm lymphedema. The objective of this study was to use bioimpedance to evaluate the efficiency of the RAGodoy® mechanical drainage device in reducing swelling in the treatment of mastectomy-related arm lymphedema. Twenty-one patients with arm lymphedema after mastectomy were enrolled in a prospective study (clinical trial) to quantitatively evaluate reductions in limb size using a passive electromechanical device to perform mechanical lymph drainage. The study was conducted in the Vascular Laser Center in São José do Rio Preto. The InBody S10® body composition analyzer was used to evaluate edema. The paired t-test was used for statistical analysis with significance being set for an alpha error = 5% (p-value < 0.05). The results showed that a significant reduction in edema was observed after mechanical lymph drainage using the RAGodoy® device (p-value < 0.012). In conclusion, lymph drainage performed with the electromechanical RAGodoy® device is effective in reducing volume of arm lymphedema as assessed by bioimpedance.

**Key Words:** lymphedema, breast cancer, treatment, bioimpedance

### Introduction

Lymphedema is characterized by an abnormal accumulation of protein-rich fluid in the tissues resulting from dysfunction of the lymphatic system, that is, an imbalance between the formation of lymph and its absorption in the initial lymphatic system (1,2).

It is one of the diseases that most leads to disability from work in the world, however there are few specific clinical trials that correctly guide treatment.

It is well known that lymphedema is one of the main complications of the treatment of breast cancer and that this affects hundreds of women all over Brazil. The World Health Organization estimates that annually there are more than 1,050,000 new cases of breast cancer worldwide making it the most common cancer among women (3). For Brazil, the estimated number of new cases

of breast cancer in 2010 was 49,240, with an estimated risk of 49 cases per 100 000 women; in the southeast of the country, breast cancer was even more common with an estimated risk of 65 new cases per 100 000 women (4). Publications reporting the development of mastectomy-related lymphedema show that the prevalence can increase to up to 50% with axillary lymph node dissection (5).

A combination of therapies is recommended for the treatment of lymphedema with the main approaches being mechanical and manual lymph drainage (6-11), bandages (12,13), hygienic care (14), exercising (15,16), myolymphokinetic activities (17,18) and drug therapy (19). However, there are few mechanical apparatuses to treat arm lymphedema. The RAGodoy® apparatus is an electromechanical device that performs passive movements of the elbow. The physiological principle used



# Association of Godoy & Godoy contention with mechanism with apparatus-assisted exercises in patients with arm lymphedema after breast cancer

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**Aims:** The aim of the current study was to evaluate the reduction in the volume of the upper limbs with lymphedema after exercises using the apparatus-assisted program associated with contention mechanisms.

**Patients and methods:** Twenty-eight female patients were selected and referred for evaluation and treatment of lymphedema after breast cancer therapy. The ages of the women ranged from 45 to 72 years with a mean age of 57 years. Inclusion criteria were treatment of cancer associated to a difference of at least 200 mL between the edematous and the contralateral limbs. Patients with active infections, skin lesions, and active disease were not included in the study. Four series of exercises using devices based on pedals, pulleys, a horizontal reflexion bar, and an elevation bar were selected. The participants were advised about the form of exercise: 15 rotations for each device, low intensity (less than 10 movements per minute), in the seated position, and the use of contention. Water displacement volumetry was performed before and after the 90-minute exercise session. The paired *t*-test was utilized with an alpha error of 5% considered acceptable (*P* value < 0.02).

**Results:** The mean difference between the volumetric measures before and after exercise was significant, with all the participants having reductions in the volume of the limbs using the four selected devices over time and at an intensity determined by this study.

**Conclusions:** Association of a Godoy and Godoy contention during apparatus-assisted exercise reduced the edema in patients with lymphedema of the upper limbs.

**Keywords:** lymphedema, exercises, devices, treatment

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## Introduction

Lymphedema is one complication of breast cancer treatment. The hypothesis of the authors is that these procedures damage the lymphatic system and make drainage of proteins and macromolecules from the cell interstice difficult.<sup>1</sup>

When lymphedema is established, the degree of dysfunction is great due to physical factors such as the reduction in joint mobility causing reductions in the amplitude of movements, weight of the limb, pain, and disability in performing day-to-day tasks.<sup>2</sup> Apart from this, the psychological state of patients is affected from the moment of breaking the news to coping with the treatment and any possible sequelae. Sequels of mastectomized patients require multidisciplinary care,<sup>3</sup> both in the prevention and treatment. On the other hand, there is consensus in respect to treatment with an association of therapies being recommended<sup>4,5</sup> including lymph drainage,<sup>6-12</sup> lymphokinetic

## Papain Associated with Urea in the Debridement of Necrotic Wounds

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### Abstract

Papain allows the effective removal of necrotic tissue in wounds by a type of enzymatic debridement. The objective of this work was to emphasize the effectiveness of the association of papain with urea in necrotic lesions. The case of a 58-year-old patient is reported with an ulcerated lesion in the Internal malleolar region of the left lower limb. The necrotic tissue was made enzymatic debridement using papain and urea and vitamin E supplement twice daily. By the fourth day the debridement was complete and was changed to a bandage with carboxymethylcellulose associated with pectin once daily. The association of papain with urea at 10% concentration proved to be efficient in the enzymatic debridement of a wound of the lower limb. This is another option of removing necrotic tissue when a selective process is desired.

**Keywords:** Papain; urea; debridement; ulcer.

### Introduction

Debridement of the necrotic tissue of a wound is essential for granulation and re-epithelization. This is particularly important for large wounds and in the presence of cellulitis and sepsis<sup>[1]</sup>. Debridement involves the removal of devitalized contaminated tissue and foreign bodies<sup>[2]</sup> and thus this procedure can reduce contamination of the wound<sup>[3]</sup>. Although the organism presents with physiological debridement mechanisms, studies have shown that this process can be accelerated by utilizing additional procedures<sup>[1,10]</sup>.

Debridement can be achieved by surgical, mechanical, autolytic and enzymatic procedures<sup>[1,7]</sup>. Enzymatic debridement is utilized in patients that would not tolerate a surgery and for smaller lesions. Several debriding agents are used including collagenase, fibrinolysin, deoxyribonuclease and papain. Papain is derived from the papaya fruit, collagenase from bacteria and the fibrinolysins and deoxyribonuclease from bovine extracts<sup>[4]</sup>. Papain destroys collagen when sulfhydryl groups are present, a condition that can be achieved by adding urea in its preparation<sup>[5,6]</sup>. It should be remembered that all these substances may cause sensitization when in contact with the skin and so the

patient may evolve with erythema and vesication on the skin surface<sup>[6]</sup>.

Each wound should be assessed in order to define the best method; occasionally an association of methods is recommended. Surgical debridement is the fastest and most effective method to remove necrotic tissue and enzymatic debridement is the most selective.

Papain has been utilized in different ways. In the USA, it is associated with urea and in Brazil it is employed using a natural approach, by placing the papaya fruit itself on the wound, in saline solutions and in the form of paste or gel<sup>[7,8]</sup>.

The aim of the current study was to demonstrate the use of a mixture of papain and urea for debridement in necrotic lesions.

### Case report

The case of a 58-year-old patient is reported. The patient had a history of left leg ulcers over a two-year period, with the dressings being changed on a daily basis. Even so the wound suddenly deteriorated causing much pain and the formation of necrotic tissue and pus (Figure 1). As the region was adversely affected and as

## Clinical treatment of arm lymphedema in an outpatient setting: Two years of follow up

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### Abstract

The aim of this study is to report on a multidisciplinary outpatient approach to the clinical treatment of lymphedema adapting the conditions of an existing work. The reduction in breast-cancer related lymphedema over two years was evaluated in a retrospective study for a group of 31 women with ages ranging between 35 and 83 years old (mean 56.6 years) in the Godoy Clinic in São José do Rio Preto. The treatment involved manual lymph drainage using the Godoy & Godoy technique, active and passive exercises utilizing facilitating apparatuses designed for these patients, a home-made compression sleeve made of a cotton-polyester fabric, nutritional guidance, psychological support, guidance about occupational activities (day-to-day activities, work and handicraft activities) and directed hydrogymnastics. Constant readjustments were made to the compression sleeves by a professional seamstress. Monthly evaluations were made by water-displacement volumetry. Analysis of variance was employed for statistical analysis with an alpha level of 5% ( $p$ -value < 0.05) being considered acceptable. The mean reduction in the first year was 55.2% and in the second year it was 75.8%, respectively, both of which were statistically significant ( $p$ -value < 0.001). Significant reduction of breast-cancer related lymphedema and maintenance of the results is possible, however routine check-ups and guidance should continue for periods determined by the treatment team.

**Key words:** Lymphedema, breast cancer, treatment

### Introduction

Destruction of the lymphatic system causes a progressive and chronic condition with functional impairment and disabilities limiting patients in their daily activities, and thus involving nearly all aspects of their quality of life<sup>1,2</sup>. Lymphedema is a public health issue deserving greater attention. More systematic surveillance for earlier detection and the potential benefits of physical activity to prevent lymphedema and mitigate symptoms warrant further clinical integration and research<sup>3</sup>. Strong correlations have been found between the severity of edema and fear of movement. There is a significant negative relationship between the

fear of movement with quality of life and with home-based exercise programs<sup>4</sup>.

The management of sequelae of conservative breast treatment must therefore involve a multidisciplinary approach; patients not only expect better cosmetic appearance, but also want to focus on other treatment advances such as improvement of psychological and sensory outcomes<sup>5</sup>. One study suggests that quality of life significantly improves during the maintenance phase of upper limb lymphedema treatment, which was necessarily correlated to a reduction in limb volume<sup>6</sup>.

An association of therapies is suggested in the treatment of lymphedema including lymph drainage, compression therapy, myolymphokinetic exercises and activities, and skin care<sup>7</sup>. The aim of the current study is

ARTÍCULO ORIGINAL

## Drenaje Linfático Mecánico en el Tratamiento de Pacientes Pos-mastectomía - Estudio Piloto

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### Resumen

El objetivo del presente estudio fue evaluar la eficiencia de un nuevo dispositivo para el drenaje linfático mecánico en la reducción del volumen de miembros superiores con linfedema. Se seleccionaron, de manera aleatoria, 13 mujeres participantes de un grupo de rehabilitación de linfedema de miembros superiores pos-tratamiento quirúrgico y radioterapéutico de cáncer de mama. Las pacientes se sometieron a una sesión de drenaje linfático mecánico durante una hora. Para la evaluación se utilizó la medida de volumetría (técnica de desplazamiento de agua), en el miembro superior afectado antes e inmediatamente después de la sesión. Para el análisis estadístico se utilizó el test t pareado, considerando un error alfa de 5%. La pérdida media del volumen fue de 83,5 ml ( $\pm 33,7$  ml) en el volumen de los miembros y los resultados obtenidos demostraron en forma estadística significantes (valor  $p < 0,0001$ ). No hubo complicaciones. Se concluye que el drenaje linfático mecánico por medio del dispositivo RAGodoy® demostró ser una forma de tratamiento segura y eficiente en la reducción del volumen del linfedema de miembros superiores.

**Palabras clave:** Linfedema. Tratamiento. Drenaje linfático. Mastectomía. Dispositivo.

### Abstract

### **2.3 Artigos Enviados para Publicação**

- 1- Godoy JMP, Guimarães TD, Pereira de Godoy LM, Guerreiro Godoy Mde F.  
Cervical Stimulation Therapy reduces laryngeal cancer treatment-related lymphedema.  
Acta Oto-Laringologica
  
- 2- Godoy JMP, Pinto RL, Guimarães TD, Barufi S, Guerreiro Godoy Mde F.  
Synergistic effect to reduce edema by frequently adjusting non-elastic stockings.  
Journal of European Academy of Dermatology Venereology.
  
- 3- Godoy JMP, Guimarães TD, Libanori DZ, Silva EB, Guerreiro Godoy M de F.  
Grosgrain stocking in the treatment of leg lymphedema as a monotherapy. Medical  
Principles and Practice.
  
- 4- de Godoy JMP, Guimarães TD, Pinto RL, Brigidio PAF, Guerreiro Godoy M de F.  
Association of elastic stockings with Mechanical Lymphatic Therapy. Central European  
Journal of Medicine.

Jose Maria

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De: em.jos.0.372804.830c1787@editorialmanager.com em nome de Indian Journal of Otolaryngology and Head & Neck Surgery [jnamdev@rediffmail.com]  
Enviado em: sexta-feira, 15 de novembro de 2013 11:47  
Para: Jose Maria Pereira de Godoy  
Assunto: LJO: A manuscript number has been assigned to Cervical Stimulation Therapy reduces laryngeal cancer treatment-related lymphedema - [JMO:252cbfa7cafb0c]

Dear Dr Pereira de Godoy,

Your submission entitled "Cervical Stimulation Therapy reduces laryngeal cancer treatment-related lymphedema" has been assigned the following manuscript number: 1200-D-13-08613.

You will be able to check on the progress of your paper by logging on to Editorial Manager as an author.  
The URL is <http://ijoo.edmgr.com/>.

Thank you for submitting your work to this journal.

Kind regards,

Editorial Office  
Indian Journal of Otolaryngology and Head & Neck Surgery

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**Cervical Stimulation Therapy reduces laryngeal cancer treatment-related lymphedema**

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Assunto: JEADV - JEADV-2013-1400

Journal of the European Academy of Dermatology and Venereology JEADV-2013-1400

Dear Dr. DE GODOY

Your manuscript entitled

Synergistic effect to reduce edema by frequently adjusting non-elastic stockings ( JEADV-2013-1400)

has been received in the Journal of the European Academy of Dermatology and Venereology Office and is currently being reviewed.

The manuscript has been assigned No. JEADV-2013-1400. Please, refer to this number in all communications.

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**Synergistic effect to reduce edema by frequently adjusting non-elastic stockings**

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KARGER

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Welcome Dr. José Maria Pereira de Godoy

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Submitted: 30/09/2013 Current Status: Under Review

**Grosgrain stocking in the treatment of leg lymphedema as a monotherapy**

**Running Title:** Grosgrain stocking and lymphedema

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**Jose Maria**

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**De:** em.cejmed.033e5e3.a0017095@editorialmanager.com em nome de Central European Journal of Medicine [markiewicz@cejm.com]  
**Enviado em:** quinta-feira, 20 de junho de 2013 13:13  
**Para:** da Goddy Jose Maria Pereira  
**Assunto:** A manuscript number has been assigned to Association of elastic stockings and Mechanical Lymphatic Therapy

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Kind regards,

Inga Markiewicz, MD, PhD  
Managing Editor  
Central European Journal of Medicine

**Association of elastic stockings and Mechanical Lymphatic Therapy-**

**Running title: Elastic stockings in Mechanical Lymphatic Therapy**

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