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Case Report

Rehabilitation of Lower Limb Swelling and Asymmetry in A Patient with Lipedema and Primary Lymphedema: A Case Report

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Abstract

Lipedema is a chronic condition of subcutaneous fat tissue that mainly affects women. It may cause painful enlargement of the lower limbs, heaviness, easy bruising, and reduced mobility. Primary lymphedema is caused by abnormal development of the lymphatic system and can lead to long-term swelling. When these two conditions occur together, it may be difficult to assess swelling and plan rehabilitation.

This case report describes changes in lower limb volume, differences between the two limbs, and body composition after inpatient rehabilitation in a 34-year-old woman. She had stage two lipedema and primary lymphedema affecting both lower limbs, with stage one on the right and stage two on the left. Her symptoms began during adolescence. At admission, she reported swelling, heaviness, tightness, cold feet, and easy bruising. She was able to walk independently. The patient completed a 22-day inpatient program that included complex decongestive physiotherapy and a calorie-restricted diet. Treatment included manual lymphatic drainage, intermittent pneumatic compression, multilayer compression bandaging, exercises under compression, patient education, and nutritional counseling. Lower limb volume was measured with optoelectronic perometry before and after rehabilitation. Limb circumference, body weight, and body composition were also assessed. Right limb volume decreased from 15,669 to 13,674 milliliters, a reduction of 12.7 percent. Left limb volume decreased from 14,378 to 13,502 milliliters, a reduction of 6.1 percent. Total volume of both limbs decreased by 9.6 percent. The absolute volume difference between the limbs decreased from 1,291 to 172 milliliters. Body weight decreased by 5.4 kilograms, and estimated extracellular water decreased by 1.3 liters. Most circumference measurements decreased, although ankle circumference increased slightly on both sides. The different responses between the limbs may be related to baseline volume or tissue characteristics, but these factors were not directly tested. Because the patient also followed a calorie-restricted diet, the effects of individual treatment components cannot be separated. Walking performance, joint function, and long-term outcomes were not measured. In this patient, combined rehabilitation and dietary intervention were associated with reduced lower limb volume and volume asymmetry. Measuring each limb separately may help clinicians describe treatment response, but further studies are needed to assess functional effects.

Keywords: lipedema, lymphedema, rehabilitation, lower extremity.

1. Introduction

Lipedema is a chronic disorder of subcutaneous adipose tissue that mainly affects women. It is characterized by disproportionate fat accumulation, particularly in the lower limbs, and may cause pain, heaviness, tenderness, and easy bruising. These symptoms can reduce mobility, physical activity, and quality of life [1].

Lymphedema results from impaired lymphatic drainage and fluid accumulation in the tissues. Primary lymphedema is related to abnormal development of the lymphatic system, while secondary lymphedema develops due to acquired damage or dysfunction [2]. The coexistence of lipedema and primary lymphedema may make the assessment and treatment of lower limb swelling more difficult.

Complex decongestive physiotherapy (CDP) includes manual lymphatic drainage, compression, exercise, and skin care [2]. Previous studies have reported reductions in limb volume following conservative treatment in patients with lipedema [3] and lipedema with secondary lymphedema [4].

In addition to swelling, lipedema may affect the musculoskeletal system and lower limb function. A previous study reported that lipedema was associated with greater pain and functional limitations in patients with knee osteoarthritis [5]. A recent review also reported reduced walking capacity and lower limb muscle strength in women with lipedema [6]. These findings highlight the importance of considering musculoskeletal function during rehabilitation. However, evidence regarding rehabilitation outcomes in patients with coexisting lipedema and primary lymphedema remains limited.

This case report describes changes in lower limb volume, interlimb asymmetry, and body composition following intensive complex decongestive physiotherapy in a patient with stage II lipedema and bilateral primary lymphedema of different clinical stages.

2. Description of Clinical Case

A 34-year-old woman was admitted to a specialized lymphology clinic in Germany between October 25 and November 15, 2012. She reported bilateral lower limb swelling, heaviness, tightness, cold feet, and easy bruising. She had been diagnosed with stage II lipedema and bilateral primary lymphedema (stage I on the right and stage II on the left) in 2002. Her symptoms had started during adolescence.

Her medical history included left ankle ligament surgery, scalp psoriasis, and penicillin allergy. She had two previous pregnancies and a family history of obesity and enlarged lower limbs. She was using oral contraceptives and compression stockings. At admission, her height was 165 cm, weight was 89.6 kg, and body mass index was 32.9 kg/m². She had lost approximately 17 kg since March 2012.

Physical examination showed soft, elastic swelling in both lower limbs and poorly defined joint contours. Forefoot swelling was more pronounced on the left. Stemmer's sign was positive on the left and equivocal on the right. No persistent pitting edema was observed. The patient was independently mobile.

The patient received a 22-day inpatient rehabilitation program based on intensive-phase CDP. Manual lymphatic drainage was performed for 45 minutes, six days per week. Intermittent pneumatic compression was applied using a Lympha-Press device at 30–40 mbar. Multilayer compression bandages were applied after treatment and maintained until the following day. The program also included exercises under compression, patient education, and nutritional counseling. A calorie-restricted diet of approximately 1,200 kcal/day was provided.

Lower limb volume was measured using an optoelectronic Perometer on October 25 and November 14, 2012. Circumference was assessed at defined anatomical levels. Body weight and body composition were assessed using bioelectrical impedance analysis. Only descriptive changes were reported; no inferential statistical analysis was performed.

Right limb volume decreased from 15,669 to 13,674 mL (−12.7%), while left limb volume decreased from 14,378 to 13,502 mL (−6.1%). Total bilateral limb volume decreased by 2,871 mL (9.6%). The absolute interlimb volume difference decreased from 1,291 to 172 mL (86.7%) (Table 1).

Table 1 - Changes in lower extremity volume following rehabilitation

Parameter	Before	After	Change
Right limb volume (mL)	15,669	13,674	−1,995 (−12.7%)
Left limb volume (mL)	14,378	13,502	−876 (−6.1%)
Total limb volume (mL)	30,047	27,176	−2,871 (−9.6%)
Absolute interlimb difference (mL)	1,291	172	−1,119

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Circumference decreased at most sites. Maximum calf circumference decreased by 1.2 cm bilaterally, while mid-thigh circumference decreased by 2.2 cm on the right and 1.6 cm on the left. Ankle circumference increased slightly on both sides (Table 2).

Table 2 - Lower extremity circumference measurements before and after rehabilitation

Measurement site	Right before	Right after	Left before	Left after
Ankle (cm)	25.2	26.1	25.7	26.1
Distal calf (cm)	25.4	25.2	25.0	24.9
Maximum calf (cm)	40.6	39.4	40.1	38.9
Below knee (cm)	39.5	38.3	40.3	39.2
Knee (cm)	45.2	44.4	45.0	44.9
Mid-thigh (cm)	68.3	66.1	67.1	65.5

Body weight decreased by 5.4 kg. Total body water decreased by 1.5 L, including a 1.3 L reduction in extracellular water. Estimated body fat mass also decreased (Table 3).

Table 3 - Changes in body weight and body composition

Parameter	Before	After	Change
Body weight (kg)	89.6	84.2	−5.4
BMI (kg/m²)	32.9	30.9	−2.0
Total body water (L)	38.2	36.7	−1.5
Extracellular water (L)	16.3	15.0	−1.3
Intracellular water (L)	21.9	21.7	−0.2
Estimated body fat mass (kg)	37.5	32.7	−4.8
Fat-free mass (kg)	52.1	50.1	−2.0

4. Discussion

This case showed reductions in lower limb volume and interlimb asymmetry following a 22-day rehabilitation program. Both limbs showed volume reductions, but the right limb had a greater percentage reduction than the left. These findings suggest that rehabilitation may help reduce lower limb swelling in patients with coexisting lipedema and primary lymphedema.

Volkan-Yazıcı et al. reported reductions in both lower limb volumes following CDP in patients with lipedema [3]. Esmer and Schingale also reported reductions in limb volume and circumference in 15 patients with lipedema and secondary lymphedema [4]. Our findings are consistent with these studies. However, our patient had bilateral primary lymphedema, which represents a different clinical condition.

The right limb, classified as stage I lymphedema, showed a 12.7% volume reduction, compared with 6.1% in the left limb, classified as stage II. Advanced lymphedema may involve tissue fibrosis and fat deposition [2]. These changes could affect treatment response. However, fibrosis was not measured in this patient. Therefore, the different responses cannot be attributed directly to lymphedema stage. Baseline volume and individual tissue characteristics may also have contributed.

The absolute interlimb volume difference decreased by 86.7%. This finding highlights the value of measuring each limb separately. Total bilateral volume reflects overall change but may not show differences between limbs. From an orthopedic rehabilitation perspective, lower limb asymmetry may be important because differences in limb size could affect comfort, mobility, and daily activities. However, these possible effects were not directly assessed in this case. Individual limb measurements may help clinicians monitor rehabilitation outcomes and identify differences in treatment response.

Lipedema may also affect musculoskeletal health and physical function. Ekti et al. reported greater knee pain and functional limitations in patients with knee osteoarthritis and lipedema [5]. In addition, a recent review reported reduced walking capacity and lower limb muscle strength in women with lipedema [6]. These findings suggest that the management of lipedema should consider both swelling and musculoskeletal function. Although lower limb volume decreased in our patient, it is not known whether these changes improved walking ability, joint mobility, or

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physical performance. Future studies should include objective functional assessments to examine these possible relationships.

Extracellular water decreased during rehabilitation, suggesting changes in body fluid distribution. However, bioelectrical impedance analysis provides estimates rather than direct measurements of limb fluid loss. The patient also lost 5.4 kg while following a calorie-restricted diet. Therefore, volume reductions may reflect the combined effects of rehabilitation and weight loss. The contribution of each treatment component cannot be determined. Although total limb volume decreased, ankle circumference increased slightly on both sides. Regional differences in swelling or measurement conditions may explain this finding. Baseline and follow-up assessments were performed at different times of day, which may have affected the results.

This case has several limitations. It describes one patient, and the findings cannot be generalized. The combined intervention prevents conclusions about the effects of CDP alone. No objective measures of gait, muscle strength, joint range of motion, or physical function were available. Therefore, functional improvement cannot be assumed. Long-term follow-up was also unavailable.

5. Conclusions

In this patient with lipedema and bilateral primary lymphedema, intensive rehabilitation combined with dietary intervention was associated with reductions in lower limb volume and the absolute volume difference between the limbs. The response differed between the two limbs, which supports measuring each limb separately during follow-up. Because this report describes one patient receiving several treatments at the same time, no causal effect or improvement in physical function can be established. Future studies should assess both limb volume and functional outcomes.

Ethical Approval. Written consent for publication of medical information was obtained from the clinic.

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All authors have read and approved the final manuscript and signed the journal's author rights transfer form.

AI Declaration. The authors declare that no AI or AI-assisted technologies were used at any stage of the research, data analysis, drafting, or editing of this manuscript. The entire work was conceived and written solely by human authors.

References

1. Herbst, K. L., Kahn, L. A., Iker, E., Ehrlich, C., Wright, T., McHutchison, L., ... & Larson, E. (2021). Standard of care for lipedema in the United States. Phlebology, 36(10), 779-796. https://doi.org/10.1177/02683555211015887

2. Executive Committee. (2016). The diagnosis and treatment of peripheral lymphedema: 2016 consensus document of the International Society of Lymphology. Lymphology, 49(4), 170-184. https://pubmed.ncbi.nlm.nih.gov/39207406/

3. Volkan-Yazıcı, M., Yazici, G., & Esmer, M. (2021). The effects of complex decongestive physiotherapy applications on lower extremity circumference and volume in patients with lipedema. Lymphatic Research and Biology, 19(1), 111-114. https://doi.org/10.1089/lrb.2020.0080

4. Esmer, M., & Schingale, F. J. (2024). Effect of physical therapy on circumference measurement and extremity volume in patients suffering from lipedema with secondary lymphedema. Lymphatic Research and Biology, 22(1), 8-11. https://doi.org/10.1089/lrb.2023.0013

5. Ekti, H., Toktas, H., Yesil, H., & Kaya, F. (2024). Assessment of lower extremity venous insufficiency and lipedema and their association with knee symptoms, functions, and quality of life in patients with knee osteoarthritis. Phlebology, 39(4), 251-258. https://doi.org/10.1177/02683555231221615

6. Malm, I. Å., Nilsson, P. V., & Hurtig-Wennlöf, A. (2026). Objective measures of physical activity and physical capacities in lipedema-a scoping review. BMC Women's Health, 26, 50. https://doi.org/10.1186/s12905-026-04271-y

Липедемасы және біріншілікті лимфедемасы бар науқаста аяқтың ісінуі мен асимметриясы кезіндегі оңалту: Клиникалық жағдай

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Түйіндеме

Липедема негізінен әйелдерде кездесетін теріасты май тінінің созылмалы ауруы болып табылады. Ол аяқтың ауырып ісінуіне, ауырлық сезіміне, көгерудің оңай пайда болуына және қозғалыс мүмкіндігінің шектелуіне әкелуі мүмкін. Біріншілікті *лимфедема лимфа* жүйесінің қалыптан тыс дамуынан туындайды және ұзақ уақыт сақталатын ісінуге себеп болуы ықтимал. Аталған екі жағдай қатар кездескенде, ісінуді бағалау және оңалту жоспарын құру қиындауы мүмкін.

Бұл клиникалық жағдай ұсынылған қолжазбада стационарлық оңалтудан кейінгі науқастың аяқтарының көлемінің, олардың арасындағы айырмашылықтың және дене құрамының өзгерістері сипатталады. Науқас — 34 жастағы әйел. Оған екі аяқты да зақымдаған II сатыдағы *липедема* және біріншілік *лимфедема* диагнозы қойылған: оң жақта — I саты, сол жақта — II саты. Симптомдары жасөспірім кезінен басталған. Стационарға түскен кезде ол ісінуге, ауырлық пен керілу сезіміне, аяқтарының тоңуына және көгерудің оңай пайда болуына шағымданған. Науқас өздігінен жүре алған. Ол калориясы шектелген диетамен қатар кешенді деконгестивті физиотерапияны қамтыған 22 күндік стационарлық оңалту бағдарламасынан өтті. Емге қолмен *лимфалық* дренаж, үзік-үзік пневматикалық компрессия, көпқабатты компрессиялық таңу, компрессия жағдайында орындалатын жаттығулар, науқасты оқыту және тамақтану жөнінде кеңес беру кірді. Оңалтуға дейін және одан кейін аяқтың көлемі оптоэлектрондық перометрия әдісімен өлшенді. Аяқтың шеңбері, дене салмағы және дене құрамы да бағаланды. Оң аяқтың көлемі 15 669 *мл*-ден 13 674 *мл*-ге дейін азайды, яғни 12,7%-ға төмендеді. Сол аяқтың көлемі 14 378 *мл*-ден 13 502 *мл*-ге дейін азайып, төмендеу 6,1%-ды құрады. Екі аяқтың жалпы көлемі 9,6%-ға азайды. Аяқтардың абсолютті көлемінің айырмасы 1 291 *мл*-ден 172 *мл*-ге дейін төмендеді. Дене салмағы 5,4 кг-ға, ал есептік жасушадан тыс сұйықтық көлемі 1,3 литрге азайды. Шеңбер өлшемдерінің көпшілігі төмендеді, алайда екі жақта да тобық шеңбері аздап ұлғайды. Аяқтың оңалтудан кейінгі өлшеміндегі айырмашылығы бастапқы көлемге немесе тіндердің ерекшеліктеріне байланысты болуы мүмкін, бірақ бұл факторлар тікелей зерттелмеді. Науқас калориясы шектелген диетаны да ұстанғандықтан, емнің жекелеген құрамдас бөліктерінің әсерін ажырату мүмкін емес. Жүру қабілеті, буын қызметі және ұзақ мерзімді нәтижелер бағаланбады. Осы науқаста оңалту мен диеталық араласуды қатар жүргізу аяқтың көлемінің және олардың асимметриясының азаюымен қатар байқалды. Әр аяқтың көлемін жеке өлшеу емге жауапты сипаттауға көмектесуі мүмкін, алайда оның функционалдық әсерін бағалау үшін қосымша зерттеулер қажет.

Түйін сөздер: *липедема*, *лимфедема*, оңалту, аяқ.

Реабилитация отека и асимметрии нижних конечностей у пациента с *липедемой* и первичной *лимфедемой*: Клинический случай

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Резюме

Липедема — хроническое заболевание подкожной жировой ткани, которое преимущественно встречается у женщин. Она может вызывать болезненное увеличение нижних конечностей, чувство тяжести, легкое образование кровоподтеков и ограничение подвижности. Первичная *лимфедема* обусловлена нарушением развития *лимфатической* системы и может приводить к длительно сохраняющемуся отеку. Сочетание этих состояний затрудняет оценку выраженности отека и планирование реабилитации.

В данной рукописи описаны изменения объема нижних конечностей, разницы между ними и состава тела после стационарной реабилитации. Пациентка — 34-летняя женщина с *липедемой* II стадии и первичной *лимфедемой* обеих нижних конечностей: I стадии справа и II стадии слева. Симптомы появились в

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подростковом возрасте. При поступлении пациентка сообщала об отеке, тяжести и стянутости, ощущении холода в стопах и повышенной склонности к образованию кровоподтеков. Пациент передвигалась самостоятельно. Она прошла 22-дневную стационарную программу, включавшую комплексную противоотечную физиотерапию и низкокалорийную диету. Лечение включало ручной лимфодренаж, перемежающуюся пневматическую компрессию, многослойное компрессионное бинтование, упражнения в условиях компрессии, обучение пациентки и консультации по питанию. Объем нижних конечностей измеряли методом оптоэлектронной перометрии до и после реабилитации. Также оценивали окружность конечностей, массу тела и состав тела. Объем правой конечности уменьшился с 15 669 до 13 674 мл — на 12,7%. Объем левой конечности снизился с 14 378 до 13 502 мл — на 6,1%. Суммарный объем обеих конечностей уменьшился на 9,6%. Абсолютная разница объемов между конечностями сократилась с 1 291 до 172 мл. Масса тела снизилась на 5,4 кг, а расчетный объем внеклеточной жидкости — на 1,3 л. Большинство измерений окружности уменьшилось, хотя окружность лодыжек с обеих сторон немного увеличилась. Различия в ответе конечностей на лечение могут быть связаны с исходным объемом или характеристиками тканей, однако эти факторы непосредственно не исследовали. Поскольку пациентка также соблюдала низкокалорийную диету, вклад каждого компонента лечения в достигнутые результаты определить не удалось. Показатели ходьбы и функции суставов, а также отдаленные результаты не оценивали. У данной пациентки сочетание реабилитации и диетического вмешательства сопровождалось уменьшением объема нижних конечностей и выраженности асимметрии. Раздельное измерение объема каждой конечности может помочь клиницистам описывать ответ на лечение, однако для оценки функциональных эффектов необходимы дальнейшие исследования.

Ключевые слова: липедема, лимфедема, реабилитация, нижняя конечность.

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