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Case Report

Effects of an 8-Week Structured Physiotherapy Program on Health-Related Quality of Life and Walking Speed in a Child Following Rotationplasty: A Case Study

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Abstract:

Children undergoing rotationplasty for osteosarcoma frequently experience a combination of post-operative challenges, including muscle weakness and difficulties in gait. This case study aimed to evaluate the effects of an 8-week structured physiotherapy intervention on these functional limitations, as well as health-related quality of life, walking speed, and ankle joint range of motion (ROM) in a child prior to prosthetic fitting. A 12-year-old boy received rotationplasty for the treatment of left distal femoral osteosarcoma. A structured physiotherapy program was implemented, commencing immediately post-operatively and progressing through a series of stages tailored to the patient's evolving functional capacity. QE-5D-5L visual analogue scale (VAS) self-report, 10-meter walk test performance, and ankle joint ROM were assessed at baseline, 4 weeks, and 2 months post-physiotherapy intervention, representing key milestones in the pre-prosthetic rehabilitation phase, during which improvements in health-related quality of life, walking speed, and ankle joint ROM were assessed. Scores on the QE-5D-5L VAS increased from 94% to 99%, walking speed improved from 0.31 m/s to 0.83 m/s, ankle dorsiflexion range of motion (ROM) increased from -15° to 20°, and ankle plantarflexion ROM increased from 50° to 75°. These findings suggest that the early initiation of physiotherapy, which includes strengthening exercises, gait training, and balance activities, is effective in enhancing functional outcomes in pediatric patients following rotationplasty.

Keywords: Osteosarcoma; Physiotherapy; Health Status; Walking Speed; Rotationplasty

Introduction

Osteosarcoma is one of the most common cancer disease that appear among children, especially during puberty with unknown causes [1]. Usually, osteosarcoma occurs in the growth area of long bone [2]. Osteosarcoma is diagnosed clinically from the localized pain with range of motion (ROM) limitation of the joint [3]. Radiology such as X-ray, MRI, and CT are required to detect any soft tissue damages and seek for any metastasis [4].

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While osteosarcoma treatment often involves chemotherapy followed by surgical intervention such as carcinologic resection, amputation, and rotationplasty. The long-term functional outcomes depend significantly on effective post-operative rehabilitation [5].

Rotationplasty (RP) is a surgical procedure that was used long time ago for congenital and acquired lower extremity bone loss [6]. In 1974, RP was introduced as a limb-salvage procedure instead of performing the amputation [7].

RP is a limb salvage surgical procedure primarily performed in children and adolescents with osteosarcoma affecting the lower limb (distal femur and proximal tibia) [8]. During the procedure, the affected portion of the femur is resected, and the remaining lower leg, including the tibia, fibula, and foot, is then rotated 180 degrees and reattached to the remaining femur [9]. This rotation allows the foot to function as a knee joint. RP is a well-established reconstructive procedure following resection of lower extremity osteosarcoma [10].

It is an effective operation for patients with osteosarcoma, as they regain their movement functions closer to normal movement functions [7]. Post-operative complications, including limb ischemia and infection, are a concern following RP and require careful monitoring, as they can lead to further amputation if neglected [11].

Physiotherapy management for patients with RP includes pre-operation management, post-operation management, and post-prosthetic management [12]. Post-operatively, at day 1, patients with RP should be provided with assistive devices and start ambulation on the non-affected side [12]. Also, the affected side should be immobilized by a cast for 2 months. Nevertheless, patients should continue exercises targeting both bilateral upper extremities and the non-affected lower extremity, including strengthening and endurance exercises, to enhance reliance on these limbs for ambulation. After removing the cast, patients should start bear weight on the affected side partially [12]. After removing the cast, ROM exercise should be implemented to avoid contractures [12].

After applying the prosthesis, patients should continue the physiotherapy treatment specifically for the affected side. The treatment includes strengthening exercise, ROM exercise and endurance exercise with regards to all the 4 extremities and core muscles [12].

Early and prolonged physiotherapy is essential for patients with RP to prevent complications such as contractures, loss of endurance, muscle weakness, and muscle wasting [13]. Previous studies did not mention the short-term effect before applying the prosthesis [14].

While the importance of physiotherapy in rotationplasty rehabilitation is recognized, there is a need for more research examining the effects of structured physiotherapy programs prior to prosthetic fitting. Building on previous research that demonstrated the effectiveness of physiotherapy interventions in improving functional outcomes for patients undergoing rotationplasty, this case study examines the impact of an 8-week physiotherapy regimen, initiated immediately post-operatively, on health-related quality of life and walking speed in a pediatric patient undergoing rotationplasty for osteosarcoma. We hypothesized that an 8-week targeted physiotherapy program would lead to measurable improvements in these key functional outcomes before the application of a prosthesis.

Materials and Methods

Study Design

Case study.

Case Description

This is a case of a 12-year-old boy diagnosed with osteosarcoma of the left distal femur. As the indication has been noted in the diagnosis, the operation performed was left distal osteosarcoma wide margin resection and Van nes rotationplasty by the surgeons.

The patient underwent left distal osteosarcoma wide margin resection and Van Nes rotationplasty. Pre-operative planning, including determination of osteotomy levels, was guided by MRI and long leg films. The specimens removed were left knee including distal femur, proximal tibia and fibula, skin, muscles, and subcutaneous tissue, along with posterior left knee flap. A circumferential incision was done around the mid-thigh at the level of the planned osteotomy all around. A second incision was made oval shaped distal to the tibial tubercle and the incisions were connected via a medial incision overlying the course of the femoral neurovascular bundle, and a lateral incision just posterior to the iliotibial (IT) band.

The surgical procedure consisted of left distal osteosarcoma wide margin resection and Van Nes rotationplasty. Standard surgical techniques were employed, including resection of the affected portion of the femur and rotation of the lower leg for reattachment.

Following rotation of the lower leg, osteosynthesis was performed to secure the limb. Muscle reattachment and wound closure were carried out using standard surgical techniques. Figure 1 shows a radiograph of the patient's femur post-operatively.

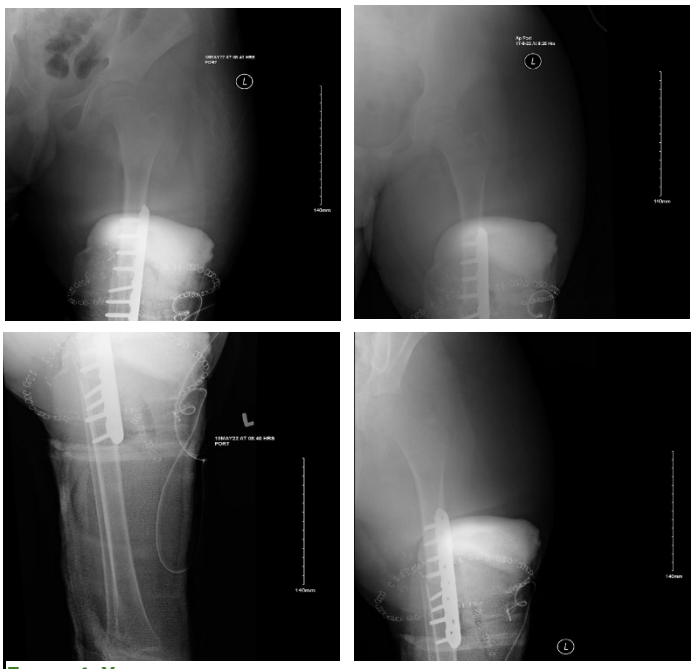

FIGURE 1: X-RAY OF THE LEFT FEMUR, POST-ROTATIONPLASTY

Patient exhibited a limited ROM in the left ankle, with dorsiflexion measured at 5 degrees and plantarflexion at 20 degrees. Manual muscle testing revealed notable weakness in the left lower extremity, with the following muscle strength grades: quadriceps 3/5, hamstrings 4/5, ankle dorsiflexors 2/5, and ankle plantarflexors 3/5. The patient ambulated with a pronounced antalgic gait pattern, relying heavily on a walking frame for support, and required moderate assistance with transfers.

Rehabilitation Program

The rehabilitation program primarily focused on physiotherapy interventions; however, it also encompassed other key components, including:

• Patient Medical History: A 12-year-old boy diagnosed with left-distal femoral osteosarcoma underwent rotationplasty. His medical history was otherwise unremarkable. Recent radiology images (MRI and long leg films) were reviewed to inform the pre-operative surgical planning and guide the post-operative physiotherapy approach.

• Psychological Well-being: The rehabilitation program included regular informal discussions with the patient and his family to address any emotional concerns related to the surgery and rehabilitation process. These discussions focused on providing encouragement, addressing anxieties, and promoting a positive mindset towards the training sessions. The patient's emotional well-being and motivation were monitored throughout the program, and adjustments were made to the training schedule as needed to accommodate his emotional state.

• Patient Comfort: The rehabilitation program prioritized the patient's comfort during sessions. This approach included ensuring the patient wore comfortable clothing and appropriate footwear, with insoles provided for the right lower extremity as needed. Furthermore, sessions were conducted in a private setting, with only the patient and his parents in attendance.

The rehabilitation program consisted of four phases, beginning with inpatient care and transitioning to outpatient care at a rehabilitation clinic.

Phase I: Day 1 post-operative until discharge from the hospital:

Deep breathing exercises were performed 4 times daily, 10 repetitions each time. Ankle pumping exercises (10 repetitions, 4 times daily) and straight leg raises (SLR) with a 5-second hold (5 repetitions, 3 times daily) were initiated. Ambulation with a walker was encouraged as tolerated, starting with short distances (2 meters) and gradually increasing the distance as the patient's strength and comfort improved. Assistance was provided as needed to ensure safety.

Phase II: Post discharge, out-patient rehabilitation program:

The primary goal of Phase II was to improve the patient's functional mobility, strength, and ROM following hospital discharge, preparing him for increased weight-bearing and eventual prosthetic fitting.

1. ROM exercises for the left ankle were performed, including active dorsiflexion, plantarflexion, inversion, eversion, and circumduction. These exercises were conducted in 3 sets of 15 repetitions, twice daily
2. Gentle Stretching Exercises for the Left Ankle Muscles: Stretch performed passively by placing the affected leg out of the bed while the patient laying in supine position. Held for 30 seconds, 3 repetitions.

3. Gentle Ankle Joint Mobilization for Dorsiflexion: Grade I and II ankle joint mobilizations were performed by the therapist to improve dorsiflexion range. Mobilizations consisted of gentle oscillations and glides, performed for 5 minutes.
4. Strengthening exercises for the Right Lower Extremity: Right quadriceps, right hamstring, and right calf muscles strengthening exercises were performed using a resistance band for 3 sets of 10 repetitions.
5. Strengthening exercises for Bilateral Upper Extremities: Bicep, triceps, and shoulder abductors muscles strengthening exercises were performed using a resistance band for 3 sets of 10 repetitions.
6. Strengthening exercises for the Upper Back Muscles: Scapular retractions, squeezing the shoulder blades together, 3 sets of 15 repetitions. Furthermore, Seated rows using a resistance band for 3 sets of 10 repetitions were performed.
7. Gluteus Maximus and Gluteus Medius Activation exercises: Gluteus maximus activation exercise performed in standing, squeezing the buttocks together. Held for 5 seconds, 10 repetitions, while hip abduction exercise performed in side-lying, lifting the top leg away from the midline. 3 sets of 10 repetitions to activate the gluteus medius.
8. Sit-to-stand exercises were performed on the right lower extremity, utilizing a chair with armrests and a ladder for balance and support. As the patient's strength improved, the height of the chair was progressively reduced. The exercises were performed for 5 repetitions.
9. Gait Exercise: Gait training was performed using a walker. The patient walked 20 meters with the walker, focusing on a heel-toe gait pattern and equal weight-bearing on both lower extremities. The therapist provided verbal cues and manual assistance as needed. Gait training was performed 2 times per week.

Phase III: 2 months post-operation:

This phase focuses on continuing the exercises from Phase II, progressing them as appropriate, and introducing partial weight-bearing and hip strengthening exercises.

1. ROM Exercises for the Left Ankle: Continue with the same ROM exercises as in Phase II (dorsiflexion, plantarflexion, inversion, eversion, circumduction), but increase the repetitions to 20 per set and the hold time for stretches to 45 seconds if tolerated. Monitor the patient's progress and adjust the program as needed.
2. Gentle stretching exercises for the Left Ankle Muscles: Continue with the same stretching exercises as in Phase II but increase the hold time to 45 seconds and the repetitions to 4 if tolerated.
3. Gentle Ankle Joint Mobilization for Dorsiflexion: Continue with Grade I and II mobilizations as needed, focusing on improving dorsiflexion.
4. Strengthening exercises for the Right Lower Extremity: Continue the exercises from Phase II (quadriceps sets, hamstring curls, calf raises) but increase the resistance by using a stronger resistance band.
5. Strengthening exercises for Bilateral Upper Extremities: Continue the exercises from Phase II (bicep curls, triceps extensions, shoulder abduction), increasing resistance or as appropriate.
6. Strengthening exercises for the Upper Back Muscles: Continue the exercises from Phase II (scapular retractions, rows), increasing the resistance.
7. Gluteus Maximus Activation exercises: Continue the exercises from Phase II, focusing on proper form and increasing the hold time for standing activation to 10 seconds.
8. Gluteus Medius Strengthening exercises (Side-Lying): Continue the hip abduction exercise from Phase II, increasing the resistance.
9. Sit-to-stand on the Right Lower Extremity (with ladder assistance): Progress the sit-to-stand exercises by gradually decreasing the height of the chair. Increase the repetitions to 8-10.
10. Gait exercise: Continue gait training with the walker, gradually increasing the distance walked and focusing on improving gait pattern, balance, and weight-bearing. Introduce variations in gait training, such as walking backward.
11. Partial Weight-Bearing on the Left Lower Extremity: Partial weight-bearing exercises were initiated on the left lower extremity using a progressive stacking method. Initially, a stable wooden box was used to elevate the limb.
12. As shown in Figure 2, a stack of folded towels was placed on top of the box to further elevate the limb and reduce the amount of weight placed on the affected leg.
13. Left Hip Strengthening Exercises: Left hip flexion, extension, abduction, and adduction strengthening exercises were performed with a resistance band for 3 sets of 10 repetitions.

FIGURE 2: PARTIAL WEIGHT BEARING ON THE LEFT LOWER EXTREMITY

Phase IV: Pre-prosthesis application:

1. Left Ankle ROM Exercises: The goal of this phase is to maximize ankle ROM in preparation for prosthetic fitting. Active ankle dorsiflexion plantarflexion, inversion, eversion, and circumduction were performed. 3 sets of 15 repetitions, holding each repetition for 5 seconds.
2. Ankle stretching exercises targeting the gastrocnemius, soleus, and tibialis anterior muscles were performed. Each stretch was held for 30 seconds, with 3 repetitions per muscle group.
3. Strengthening exercises for the Left Ankle: The focus is on strengthening the ankle musculature to support prosthetic use. Plantarflexion, dorsiflexion, inversion, and eversion against resistance was performed using a resistance band; 3 sets of 10 repetitions.
4. Gait training on the Parallel Bars and with the walking frame: The goal is to prepare the patient for prosthetic gait training by improving balance, weight-bearing, and gait pattern.

- Parallel Bars: Gait training was initiated on the parallel bars. The patient practiced weight shifting, balance reactions, and stepping patterns while using the bars for support. The therapist provided manual assistance as needed to ensure safety and proper technique. Sessions lasted for 15-20 minutes.
- Walking Frame: As the patient's balance and strength improved, gait training progressed to a walking frame. The patient practiced walking with the frame, focusing on a heel-toe gait pattern and equal weight-bearing on both lower extremities. The therapist provided verbal cues and supervised the patient's gait. The distance walked gradually increased as the patient progressed. Sessions lasted for 20-25 minutes.
- Pre-prosthetic gait training: specific pre-prosthetic gait training exercises were introduced, including step-ups onto a small platform to simulate prosthetic limb advancement and balance exercises with reduced upper extremity support.

Outcome measure

EQ-5D-5L:

The EQ-5D-5L is a standardized, patient-reported outcome measure developed by the EuroQol Research Foundation. It assesses health-related quality of life across five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension is rated on a 5-level scale, ranging from 'no problems' to 'extreme problems.' The responses are then converted into a single index score, which represents overall health-related quality of life [15]. Additionally, a visual analogue scale (VAS) is included, allowing patients to rate their overall health on a scale from 0 to 100, where 0 represents the 'worst imaginable health' and 100 represents the 'best imaginable health.' The EQ-5D-5L has demonstrated excellent psychometric properties across various populations and clinical settings [16,17].

10-meter walk test:

10-meter walk test (10MWT) is a performance measure designed to detect the walking speed in meters per second (m/s) within a short distance. Additionally, 10MWT would determine the functional mobility, gait and vestibular functions [18]. 10 MWT can be tested with assistive devices or while applying the prosthesis [19]. 10 MWT requires a 10-meter distance to conduct the test, it also requires 2-meters before starting the test and 2-meters once reaching the end of the 10-meter distance for acceleration and deceleration [20].

A 10-meter walkway was marked with tape, including 2 meters of acceleration space before the start line and 2 meters of deceleration space after the finish line. The patient was instructed to walk as quickly and safely as possible through the 10-meter distance. Patient was asked

to walk beyond the finish line to avoid decelerating before the end of the measured distance. The time taken to traverse the 10-meter distance was recorded using a stopwatch [18].

Ankle ROM:
Ankle ROM was assessed using a standard goniometer. For dorsiflexion and plantarflexion measurements, the patient was positioned supine. The stationary arm of the goniometer was aligned along the longitudinal axis of the fibula, using the lateral malleolus as a point of reference. The moving arm was aligned along the longitudinal axis of the fifth metatarsal, using the fifth metatarsal head as a point of reference. The axis of the goniometer was placed over the lateral malleolus.

Data analysis

The scores of EQ-5D-5L, 10-meter walk test, and ROM were retrieved in the table to demonstrate an overview of the outcomes before and after the intervention.

Administrative and Ethical Considerations

Ethical approval was obtained by the institutional review board (IRB) at King Abdullah International Medical Research Center (KAIMRC) with reference number: NRJ23J/022/01. A written consent form was taken from the participant and his caregivers.

Results

EQ-5D-5L:

Baseline:

Patient reported that he has severe problems in walking about (MOBILITY) while using the walking frame; has moderate problems washing or dressing himself (SELF-CARE); has severe problems doing his usual activities (USUAL ACTIVITIES); has moderate pain or discomfort (PAIN/DISCOMFORT); he is slightly anxious depressed (ANXIETY/DEPRESSION); his health=94%.

4 weeks post-physiotherapy intervention:

Patient reported that he has slight problems in walking about (MOBILITY) while using the walking frame; has slight problems washing or dressing himself (SELF-CARE); has moderate problems doing his usual activities (USUAL ACTIVITIES); has moderate pain or discomfort (PAIN/DISCOMFORT); he is not anxious depressed (ANXIETY/DEPRESSION); his health=96%.

2 months post-physiotherapy intervention:

Patient reported that he has no problems in walking about (MOBILITY) while using the walking frame; has no problems washing or dressing himself (SELF-CARE); has slight problems doing his usual activities (USUAL ACTIVITIES); has slight pain or discomfort (PAIN/DISCOMFORT); he is not anxious depressed (ANXIETY/DEPRESSION); his health=99%.

10-meter walk test:

The result of 10-meter walk test is demonstrated in Table 1. The patient completed this test three times: at baseline, after 4 weeks of intervention, and 2 months post-intervention, just prior to the application of the prosthesis.

TABLE 1: IMPROVEMENT IN 10-METER WALK TEST WALKING SPEED OVER 8 WEEKS OF PHYSIOTHERAPY INTERVENTION

PERIOD	S/10M	M/S
Baseline	32 s/10m	0.31 m/s
4 Weeks Post Physiotherapy Intervention	18 s/10m	0.55 m/s
2 Months Post Physiotherapy Intervention	12 s/10m	0.83 m/s

Ankle ROM:

ROM assessments were conducted at baseline, 4 weeks post-intervention, and 2 months post-intervention.

The rehabilitation program resulted in noticeable improvements in the left ankle ROM to 20±5 degrees for dorsiflexion and 75 degrees for plantar flexion using a goniometer. Table 2 demonstrates the improvement of ankle ROM.

TABLE 2: IMPROVEMENT IN ANKLE DORSIFLEXION AND PLANTARFLEXION ROM OVER 8 WEEKS OF PHYSIOTHERAPY

	DORSIFLEXION	PLANTER FLEXION
Baseline	-15^{O}	50^{O}
4 Weeks Post Physiotherapy Intervention	10^{O}	60^{O}
2 Months Post Physiotherapy Intervention	20^{O}	75^{O}

Post-Prosthesis Follow-up:
The participant demonstrated very good improvement functionally and psychologically. He was able to walk with the crutches instead of walker. He reported that he is very satisfied with his new prosthesis. Figure 3 demonstrates the application of the prosthesis. However, continued rehabilitation is necessary to enhance the patient's independence and to improve the flexibility of the left ankle joint, thereby facilitating better mobility of the prosthesis in both flexion and extension.

A. Prosthesis Application in Standing Position

B. Prosthesis Application (Anterior View)

C. Prosthesis Application (Lateral View)

FIGURE 3: PROSTHESIS APPLICATION IN DIFFERENT POSITIONS AND KNEE DIRECTIONS

Discussion

This study aimed to investigate the 8-week effect of physiotherapy intervention prior to prosthesis application for patients with RP. Consistent with our hypothesis, the 8-week physiotherapy intervention demonstrated effectiveness in improving health status and functional mobility prior to prosthesis application.

According to the results, there was a noticeable improvement in the patient's walking speed and health status over the course of the 8-week physiotherapy intervention. It is important to note that the patient utilized assistive devices (walker and then crutches) during the 10-meter walk test, which naturally influences walking speed. Therefore, direct comparisons to normal, unassisted walking speeds are not appropriate. The 10-meter walk test was conducted prior to prosthesis application to evaluate the impact of the physiotherapy intervention on the patient's pre-prosthetic functional mobility. This assessment provides valuable information about the effectiveness of the rehabilitation program in improving walking speed before the influence of the prosthesis. Post-prosthetic 10-meter walk tests would provide further insight into the patient's functional progress with the prosthesis and should be considered for future assessments.

Although the patient reported an improved health status according to the EQ-5D-5L assessment, he continued to require assistance with certain daily activities. This observation highlights the ongoing rehabilitation needs of patients following rotationplasty. Future interventions could explore the potential benefits of integrating occupational therapy to address activities of daily living. Occupational therapy can play a particularly significant role in helping post-operative patients regain independence in their daily lives [21]. Furthermore, the impact of prosthetic fitting and subsequent rehabilitation on the patient's independence should be considered [22]. It is also important to consider that this specific physiotherapy intervention may not be effective for every patient.

Left ankle ROM exercises were implemented as part of the patient's rehabilitation program. As shown in Table 2, these exercises demonstrably increased the patient's ankle ROM. Improved ankle mobility is a key factor in successful prosthesis application [23]. This is because greater ankle mobility allows for better fitting and smoother movement with the prosthesis, ultimately leading to improved gait and function [24].

This case report demonstrates the potential benefits of an 8-week structured physiotherapy intervention, initiated immediately post-operatively, in improving health-related quality of life and walking speed in a child following

rotationplasty. While the patient demonstrated significant improvements in functional outcomes, further research is required to establish the optimal timing and components of physiotherapy interventions for this patient population. Specifically, randomized controlled trials are needed to investigate the effectiveness of early physiotherapy interventions, including ROM exercises and muscle strengthening techniques, initiated on day 1 post-rotationplasty. This case study contributes to the existing literature by highlighting the importance of pre-prosthetic rehabilitation and the need for further investigation in this area.

Limitations

This study is limited by its single case study design, which restricts the generalizability of the findings. The absence of a control group limits our ability to determine the specific effects of the physiotherapy intervention compared to natural recovery or other potential factors. While the EQ-5D-5L provides valuable patient-reported data, it is a subjective measure and may be influenced by individual perceptions and biases. The follow-up period was limited to the pre-prosthetic phase, and long-term outcomes were not assessed. The patient was a 12-year-old male with osteosarcoma, and the findings may not be applicable to other patient populations. Due to the single case study design, no statistical analysis was performed. Therefore, we cannot determine the statistical significance of the improvements observed. Furthermore, the specific 8-week physiotherapy protocol used in this case may not be representative of all physiotherapy interventions for this patient population. Consequently, the findings of this case study are limited in their generalizability to a broader patient population.

Conclusion

This case report highlights the potential benefits of an 8-week structured physiotherapy intervention, initiated immediately post-operatively, in enhancing health-related quality of life and walking speed in a pediatric patient following rotationplasty. The patient demonstrated notable improvements in functional outcomes. However, due to the inherent limitations of a single case study, further rigorous, controlled studies, particularly randomized controlled trials, are necessary to establish evidence-based guidelines for physiotherapy management following rotationplasty. This case study contributes to the existing literature by highlighting the importance of pre-prosthetic rehabilitation and the need for further investigation in this area.

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Ethical approval statement

Ethical approval was obtained by the institutional review board (IRB) at King Abdullah International Medical Research Center (KAIMRC) with reference number: NRJ23J/022/01. A written consent form was taken from the participant and his caregivers.

Financial support and sponsorship

This study was conducted without external financial support.

Conflicts of interest

The authors report there are no competing interests to declare.

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تأثير برنامج علاج طبيعي منظم لمدة 8 أسابيع على جودة الحياة جودة الحياة المرتبطة بالصحة وسرعة المشي لدى طفل بعد عملية تدوير الأطراف: دراسة حالة

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المستخلص:
غالبًا ما يواجه الأطفال الذين يخضعون لعملية تدوير الأطراف لعلاج سرطان العظام مجموعة من التحديات بعد الجراحة، بما في ذلك ضعف العضلات وصعوبات في المشي. هدفت دراسة الحالة هذه إلى تقييم تأثيرات برنامج علاج طبيعي منظم لمدة 8 أسابيع على هذه القيود الوظيفية، بالإضافة إلى جودة الحياة المتعلقة بالصحة وسرعة المشي، ومدى حركة مفصل الكاحل لدى طفل قبل تركيب الطرف الاصطناعي. تلقى صبي يبلغ من العمر 12 عامًا عملية تدوير الأطراف لعلاج سرطان العظام في عظم الفخذ البعيد الأيسر. تم تطبيق برنامج علاج طبيعي منظم، بدأ فورًا بعد الجراحة ومرورًا بسلسلة من المراحل المصممة خصيصًا لقدرة المريض الوظيفية المتطورة. تم تقييم نتائج تقرير التقييم الذاتي لمقياس التماثل البصري (VAS) لمقياس جودة الحياة (QE-5D-5L) وأداء اختبار المشي لمسافة 10 أمتار ومدى حركة مفصل الكاحل عند خط الأساس، وبعد 4 أسابيع، وبعد شهرين من تدخل العلاج الطبيعي، مما يمثل المراحل الرئيسية في مرحلة التأهيل قبل تركيب الطرف الاصطناعي، والتي تم خلالها تقييم التحسينات في جودة الحياة المتعلقة بالصحة وسرعة المشي ومدى حركة مفصل الكاحل. زادت نتائج مقياس التماثل البصري (VAS) لمقياس جودة الحياة (QE-5D-5L) من 94% إلى 99%، وزادت سرعة المشي من 0.31 متر/ثانية إلى 0.83 متر/ثانية، وزاد مدى حركة مفصل الكاحل في الانثناء الظهري من -15 درجة إلى 20 درجة، وفي الانثناء الأخمصي من 50 درجة إلى 75 درجة. تشير هذه النتائج إلى أن البدء المبكر للعلاج الطبيعي، الذي يتضمن تمارين تقوية، وتدريب على المشي، وتمارين التوازن، مفيد لتحسين النتائج الوظيفية لدى مرضى الأطفال بعد عملية تدوير الأطراف

الكلمات الدالة: سرطان العظام، العلاج الطبيعي، الحالة الصحية، سرعة المشي، تدوير الأطراف

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