



FORTEe

Get strong to fight childhood cancer: An exercise intervention for children and adolescents undergoing anti-cancer treatment

H2020 – 945153

D6.10 Updated clinical practice guideline on exercise training in paediatric oncology

WP6 Leader:

Nina Karguth & Dr. Nina Donner (07 concentris)

Authors:

Dr. Marie Astrid Neu (01 UMC-Mainz)

Dr. Francesca Lanfranconi (06 MBBM)

Dr. Adriana Balduzzi (06 MBBM)

Nina Karguth & Dr. Nina Donner (07 concentris)

Lena Wypyrsczyk (01 UMC-Mainz)

Mareike Kühn (01 UMC-Mainz)

On behalf of the FORTEe Consortium

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Executive Summary

This deliverable presents an updated set of practice-oriented recommendations on exercise training programs in paediatric oncology developed within the EU Horizon 2020 project FORTEe (Grant Agreement No. 945153).

The document is intended as an implementation-oriented guidance resource informed by current evidence, international expert exchange and practical experience gained within the FORTEe project, rather than a formal evidence-graded clinical guideline.

FORTEe represents one of the largest European initiatives in paediatric exercise oncology, including a multicentre randomized controlled trial investigating the effects of a structured, personalised exercise intervention in children and adolescents undergoing cancer treatment. In addition to clinical research, the project has generated extensive implementation experience across diverse healthcare settings in Europe, characterised by substantial heterogeneity in infrastructure, staffing, and integration of exercise interventions into cancer care.

This document synthesises key findings and translates them into pragmatic, context-sensitive recommendations and considerations to support the integration of exercise interventions into paediatric oncology care. Particular emphasis is placed on safety, individualisation, interdisciplinary collaboration, and feasibility across different resource settings.

A central outcome of the FORTEe project is the development of the FORTEe booklet series, including both training and exercise testing resources for paediatric oncology care. These resources form a core component of this deliverable and support the translation of research findings into clinical practice.

In addition, the document outlines the involvement of FORTEe researchers in international expert groups and ongoing initiatives in paediatric oncology and exercise medicine, contributing to knowledge exchange and alignment with emerging international standards.

Overall, this deliverable aims to support clinicians, healthcare providers and stakeholders in implementing safe, feasible, and individualised exercise interventions for children and adolescents with cancer, and to contribute to the further development of exercise-based supportive care in paediatric oncology.

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1 Scientific Background and Project Context

1.1 Rationale for exercise in paediatric oncology

Over the past decades, survival rates in paediatric oncology have improved substantially, leading to a growing population of children and adolescents undergoing intensive cancer treatment and long-term survivorship (1, 2). However, cancer and its treatment are associated with a broad range of acute and long-term adverse effects, including reduced physical function, cancer-related fatigue, exercise tolerance and impairments in health-related quality of life (3-6).

In this context, exercise and physical activity have increasingly been recognised as important components of supportive care in paediatric oncology (7-10). A growing body of evidence suggests that appropriately adapted exercise interventions are feasible and safe during and after cancer treatment (11-13), and may contribute to improvements in physical fitness, functional capacity and psychosocial well-being (14-22). Despite these advances, the implementation of structured exercise programmes in routine paediatric oncology care remains inconsistent across institutions and countries (8, 23).

Several international initiatives have emphasised the importance of integrating exercise into paediatric oncology care. Existing recommendations highlight that exercise interventions should be individualised, medically supervised where appropriate and adapted to the patient's clinical condition, treatment phase and preferences (9, 10, 24). However, the translation of these principles into clinical practice is often challenged by variability in resources, infrastructure and clinical integration (8, 23).

1.2 The FORTEe project

The FORTEe project ("Get strong to fight childhood cancer") (25) is a large-scale, EU-funded Horizon 2020 research initiative aimed at advancing the role of exercise as a supportive therapy in paediatric oncology. The project brings together a multidisciplinary consortium of researchers from clinical, scientific and technological backgrounds. Family advocates are integrated within the research team in multiple European countries.

A central component of the project is a multicentre randomised controlled trial evaluating the effects of a structured, personalised exercise intervention in children, adolescents and young adults undergoing cancer treatment. The intervention integrates supervised and home-based exercise components and is designed to be adaptable across diverse clinical settings.

Beyond its clinical trial component, FORTEe has generated extensive experience in the implementation of exercise interventions across heterogeneous healthcare environments. Participating centres differed substantially in terms of available infrastructure, staffing and prior experience with exercise programmes, requiring flexible and context-sensitive implementation strategies.

1.3 From evidence generation to implementation

While research in paediatric exercise oncology has expanded considerably (7-10), a persistent gap remains between evidence generation and routine clinical implementation. Exercise interventions are still not consistently integrated into standard care pathways and access to structured programmes varies widely between institutions (8, 23).

The FORTEe project addresses this gap by combining clinical research with implementation-oriented approaches. Through the development and delivery of exercise interventions within the trial, the project has identified key facilitators and barriers relevant to real-world clinical settings. These include

factors related to interdisciplinary collaboration, medical oversight, patient engagement and resource availability.

Importantly, the project has provided practical implementation experience indicating that exercise programmes can be delivered across a broad range of settings, including those with limited infrastructure, when supported by appropriate organisational frameworks and training.

1.4 Development of practical resources within FORTEe

To support the translation of research findings into clinical practice, the FORTEe consortium has developed a range of practical resources. A central output is the FORTEe booklet series, comprising the **“Precision-Based Exercise Training Protocols in Children with Cancer”** (26) and complementary **“Exercise Testing Protocols in Children with Cancer”** (27). Standard operation procedures are added to the latter.

These resources are designed to facilitate the delivery of exercise interventions by healthcare professionals across different clinical contexts. While the training booklet provides structured and adaptable exercise protocols, the exercise testing booklet includes standardised procedures for the assessment of physical performance and exercise capacity as well as standard use of each testing device.

The exercise training booklet include graded exercise options, guidance for adaptation to clinical conditions and tools to support individualised programme design. Under the leadership of Fondazione Monza e Brianza per il Bambino e la Sua Mamma (MBBM), Centro Maria Letizia Verga, Monza, Italy, the booklet series was developed collaboratively across the consortium and reflects both evidence-based principles and practical clinical experience among the major experts in the field.

1.5 Scope of this deliverable

Building on the scientific, clinical and implementation-related work conducted within FORTEe, this deliverable synthesises key insights and translates them into practice-oriented recommendations and considerations for exercise training in paediatric oncology.

The document aims to support healthcare professionals and stakeholders in integrating exercise interventions into clinical care by:

- summarising relevant evidence and project outcomes
- outlining key considerations for safe and feasible implementation
- providing access to practical tools and resources developed within FORTEe
- create relationships between all the stakeholders involved in the process of implementing exercise in complex clinical settings

In doing so, this deliverable contributes to bridging the gap between research and practice and supports the further integration of exercise as a component of supportive care in paediatric oncology.

2 Practice-Oriented Recommendations and Considerations

The following recommendations are based on current evidence, international expert exchange and implementation experience gained within the FORTEe project. They are intended as practice-oriented considerations rather than formally evidence-graded clinical recommendations. The recommendations presented in this section are based on the recently published “Implementing

exercise interventions in paediatric oncology: an expert consensus framework from the FORTEe project” (28).

2.1 General principles

Exercise interventions in paediatric oncology should be considered as a complementary component of supportive care throughout the cancer trajectory, including during active treatment and survivorship. Based on current evidence and the experience gained within the FORTEe project, exercise programmes are feasible across a wide range of clinical settings when appropriately adapted to the individual patient.

Interventions should follow a child- and family-centred approach, taking into account age, diagnosis, treatment phase, physical capacity and personal preferences. Whenever feasible, physical activity and exercise should be introduced as early as possible in the care pathway to promote early engagement and support the maintenance of physical function throughout treatment. Flexibility is essential, as children and adolescents undergoing cancer treatment often experience fluctuating clinical conditions that require continuous adjustment of exercise intensity, type and duration.

2.2 Interdisciplinary collaboration and roles

The successful implementation of exercise interventions requires close collaboration between different professional groups. Key stakeholders include exercise professionals, paediatric oncologists, nursing staff, psychosocial support teams and family foundations.

- **Medical staff** play a central role in assessing clinical status and supporting decision-making regarding participation in exercise.
- **Exercise professionals** specifically trained to work with paediatric oncology patients are responsible for designing and delivering individualised programmes, adapting interventions based on clinical and functional information.
- **Nursing and psychosocial staff** contribute to patient engagement, identification of barriers and integration of exercise into daily care routines.
- **Family foundations** support implementation in hospital and help in funding exercise project.

Regular interdisciplinary communication is essential to ensure safe, coordinated and patient-centred implementation.

2.3 Safety and medical considerations

Ensuring patient safety is a fundamental requirement for exercise interventions in paediatric oncology.

Exercise participation should be preceded by an appropriate clinical assessment and programmes should be adapted continuously based on the patient's current medical condition. Particular attention should be paid to treatment-related side effects, acute symptoms and changes in clinical status.

Ongoing monitoring during exercise sessions is recommended to identify potential adverse events or signs of intolerance. Clear communication pathways between exercise professionals and medical staff are essential to ensure timely adaptation or interruption of exercise when needed.

In line with the FORTEe recommendations for medical clearance, exercise participation should generally follow prior approval by the treating medical team and after joint evaluation by physicians and exercise professionals. Exercise prescriptions should be individually adapted based on the patient's current clinical condition, including haematological parameters, infection status, cardiovascular and respiratory function, pain, fatigue, tumour characteristics, post-operative status

and treatment-related toxicities. Temporary modification or interruption of exercise may be required in situations such as severe thrombocytopenia, symptomatic anaemia, fever or systemic infection, severe pain, severe fatigue, respiratory insufficiency, cardiovascular instability or immediately following invasive procedures. Particular caution is warranted in patients with central nervous system tumours, bone tumours or metastases, and during administration of potentially cardiotoxic therapies, as outlined in the medical clearance recommendations provided in Supplementary File 3 of the FORTEe trial design publication (25).

2.4 Individualisation and adaptation of exercise programmes

Exercise interventions should be individualised and flexible, allowing adaptation to the heterogeneous needs of paediatric oncology patients.

Programmes may include a combination of:

- endurance training
- strength training
- flexibility exercises
- coordination and balance activities

The content and structure of each session should be adapted to the children's functional capacity, clinical status and motivation. Playful and engaging elements may support adherence, particularly in younger children.

Participation should be voluntary and encouraged through the expression of individual preferences. Temporary interruptions or reductions in intensity are appropriate in response to clinical changes. In FORTEe even the most frail children were offered individualised training approaches and based on this experience they were successfully included in the exercise intervention.

2.5 Delivery across different care settings

Exercise interventions can be implemented across inpatient, outpatient and home-based settings.

Depending on available resources, programmes may include:

- supervised in-hospital sessions
- structured home-based training
- hybrid models combining both approaches

Exercise sessions may be delivered individually, in small groups or, where appropriate, remotely via video training. The choice of delivery format should be guided by the patient's clinical condition, individual needs, available resources and local infrastructure.

Even in settings with limited infrastructure, exercise can be delivered using simple equipment or bodyweight-based activities. While this is not a prerequisite for implementation, whenever feasible, the provision of a dedicated exercise space and specialised equipment is recommended, as it can enhance the quality of care, improve patient engagement, and increase the visibility and recognition of exercise programmes within the multidisciplinary clinical team.

A stepwise approach, starting with available resources and expanding capacity over time, may facilitate sustainable integration into clinical care.

2.6 Implementation in heterogeneous resource settings

Healthcare settings differ substantially in terms of staffing, infrastructure and experience with exercise interventions. Therefore, implementation strategies should be adapted to local conditions.

Key considerations include:

- availability of trained personnel
- access to suitable exercise space
- availability of equipment
- institutional support and integration into care pathways

Centres with limited resources may begin with basic structures and gradually expand their programmes. Establishing at least minimal exercise provision, supported by appropriate training and clinical oversight, represents an important first step.

2.7 Monitoring and quality assurance

Systematic monitoring of exercise interventions is important to ensure safety and continuous improvement.

This may include:

- documentation of exercise sessions
- recording of adverse events or symptoms
- regular evaluation of patient progress

Structured documentation supports communication within the care team and contributes to quality assurance. Where possible, standardised approaches to monitoring may enhance comparability and transparency.

2.8 Use of digital tools and technologies

Digital tools may support the delivery of exercise interventions, particularly in situations where in-person supervision is limited.

Potential applications include:

- telehealth-supported exercise sessions
- mobile applications to promote physical activity (29-32)
- digital platforms for guidance and feedback (33)

These tools may enhance accessibility, motivation and continuity of care, especially during outpatient phases or periods of isolation. However, they should be considered complementary to, rather than a replacement for, professional supervision where feasible.

2.9 Summary of key considerations

Based on the FORTEe project experience, several core elements are consistently relevant for the successful implementation of exercise interventions in paediatric oncology:

- interdisciplinary collaboration
- structured clinical oversight and safety procedures
- individualised and adaptable exercise programmes (introduced early in the care pathway)
- flexible delivery across different settings

- stepwise implementation adapted to available resources
- systematic monitoring and communication
- integration of supportive technologies where appropriate

A practical example of how these principles can be implemented in routine paediatric oncology care is provided by the FORTEe exercise programme at the University Children's Hospital Ljubljana (Slovenia), established through collaboration between the FORTEe consortium members University Medical Centre Ljubljana and Forma 3D Ltd. Despite the absence of a pre-existing exercise oncology infrastructure, the programme was successfully integrated into daily clinical practice and has resulted in sustainable exercise therapy structures within the hospital. This implementation experience was presented by Milica Stefanović at the 3rd Pediatric Exercise Oncology Congress (PEOC meets FORTEe) 2026 in Mainz, Germany (oral presentation: "From Zero to Integration: Implementing Exercise Therapy in Pediatric Oncology through the FORTEe Trial at Ljubljana Children's Hospital, Slovenia"). An [accompanying video](#) demonstrating the programme and implementation approach was also presented at the conference and made publicly available.

3 Contribution to International Initiatives and Stakeholder Engagement

3.1 Integration in international expert networks

These include participation in the *SIOP Rehabilitation and Physical Medicine Working Group (RPM-WG)*, part of the International Society of Paediatric Oncology (SIOP), a global multidisciplinary organisation dedicated to improving outcomes for children and adolescents with cancer. This working group focuses on advancing rehabilitation, functional outcomes and quality of life through collaborative research and guideline-related activities.

In addition, FORTEe researchers have been actively involved in the development and establishment of the *SIOPe Working Group on Physical Activity and Exercise Therapy*, within the European branch of SIOP (SIOPe/SIOP Europe), which represents paediatric oncology professionals across Europe. The working group was formally recognised within the SIOP Europe structure in 2026 and aims to strengthen collaboration, promote harmonised approaches and support the integration of structured exercise interventions within the European paediatric oncology community.

FORTEe researchers are promoting the establishment of a Special Interest Group (SIG) on "Exercise Oncology" within the European College of Sports Sciences, the leading association in the field of exercise science in Europe. In April 2026, the SIG was approved by the Scientific Board.

3.2 Contribution to international recommendation and consensus processes

In addition to their involvement in international expert networks, members of the FORTEe consortium have contributed to ongoing recommendation and consensus processes in the field of exercise oncology.

This includes participation as authors in international expert consensus statements addressing exercise in children and adolescents with cancer (e.g., ACSM expert consensus statement (34)). Several FORTEe researchers (including Martin Kaj Fridh, Marie Neu, Carmen Fiuza-Luces and Alejandro Lucia) have contributed as co-authors to such initiatives, reflecting the integration of expertise generated within the FORTEe project into broader international efforts.

These contributions support the development of harmonised approaches and shared principles, including the importance of individualised, safe and supervised exercise interventions tailored to the needs of paediatric oncology patients. At the same time, they enable alignment between project-specific approaches and evolving international standards in the field.

3.3 Bidirectional knowledge exchange

The involvement of FORTEe researchers in international initiatives facilitates bi-directional knowledge exchange between research, clinical practice and policy development.

On the one hand, existing international recommendations and expert consensus have informed the design and implementation of the FORTEe intervention, including principles related to safety, individualisation and interdisciplinary collaboration.

On the other hand, the experiences and findings generated within the FORTEe project contribute to the ongoing development and refinement of international approaches to exercise in paediatric oncology. In particular, insights from a large, multicentre European implementation context provide valuable perspectives on feasibility, scalability and adaptation across heterogeneous healthcare settings.

3.4 Stakeholder engagement within FORTEe

Stakeholder engagement has been an integral component of the FORTEe project. The consortium includes a broad range of stakeholders, including clinicians, exercise professionals, researchers, technology developers and patient advocacy organisations.

In particular, [Youth Cancer Europe \(YCE\)](#), a European patient and survivor organisation and consortium partner within FORTEe, has contributed to integrating patient and survivor perspectives into the project. This collaboration supported the development of patient-centred exercise interventions, communication strategies and supportive materials designed to be relevant, accessible and responsive to the needs of children, adolescents and their families.

Furthermore, engagement with clinical partners across multiple European centres has enabled the identification of practical challenges and facilitators related to implementation in real-world settings.

3.5 Contribution to dissemination and future development

Through its integration into international networks and stakeholder structures, the FORTEe project contributes to the broader dissemination and uptake of exercise-based supportive care approaches in paediatric oncology.

The alignment with ongoing international initiatives supports the visibility and potential transferability of FORTEe results and resources. At the same time, the project contributes practical tools and implementation experiences that may inform future developments in the field.

These activities support the continued advancement of exercise as a component of paediatric oncology care beyond the duration of the FORTEe project.

4 FORTEe Exercise Booklets and Practical Resources

4.1 Overview of the FORTEe exercise booklets

A central outcome of the FORTEe project is the development of the FORTEe booklet series, including both the *“Precision-Based Exercise Training Protocols in Children with Cancer”* (26) and the corresponding *“Exercise Testing Protocols in Children with Cancer”* (27).

These booklets provide structured, practice-oriented resources to support the implementation of exercise interventions in paediatric oncology care.

The booklet series was developed within Work Package 3 of the FORTEe project under the leadership of **Fondazione Monza e Brianza per il Bambino e la Sua Mamma (MBBM)** and reflects the collaborative work conducted across the consortium to harmonise exercise training and testing procedures in paediatric oncology settings. The protocols were based on standardised approaches established within the FORTEe project and integrated expertise from multiple European centres.

The materials were developed collaboratively within the FORTEe consortium, integrating clinical expertise, exercise science and practical experience from multiple European centres.

The exercise testing booklets provide guidance for the standardised assessment of physical performance, including strength and exercise capacity in children and adolescents undergoing cancer treatment. Standardised exercise testing is essential to identify individual functional inefficiencies among different systems, support the personalisation of exercise interventions and evaluate the effectiveness of training programmes over time.

The booklet series is designed for healthcare professionals involved in the care of children and adolescents with cancer, including exercise professionals, physicians and allied health staff. It provides accessible and adaptable guidance to support the delivery of exercise interventions in diverse clinical settings.

The [exercise training booklet](#) has been publicly disseminated and scientifically endorsed by the European Federation of Sports Medicine Associations (EFSMA) and the Federazione Medico Sportiva Italiana (FMSI), underlining its scientific and clinical relevance for the field of paediatric exercise oncology.



Figure 1. Covers of the **FORTEe Precision-Based Exercise Training Protocols in Children with Cancer** booklet (top) and the **FORTEe Exercise Testing Protocols in Children with Cancer** booklet (bottom), illustrating the practical and adaptable nature of exercise interventions developed within the project. Booklet 1 (top) provides structured, individualised exercise training protocols to support implementation in diverse clinical settings. Booklet 2 (bottom) provides structured exercise testing protocols based on FORTEe study's participant enrolment, informed consent, and the participants' schedule for exercise testing and questionnaires before, during, and after the intervention - under closer supervision of physicians as well as exercise professionals.

4.2 Structure and content of the FORTEe booklets

The FORTEe booklet series comprises complementary exercise training and exercise testing resources designed to support both the implementation and evaluation of exercise interventions in paediatric oncology.

The **FORTEe exercise training booklet** includes a comprehensive range of exercise protocols covering key domains of physical function, including:

- endurance training
- strength training
- flexibility training
- coordination and balance training

Exercises are presented in a structured format with graded levels of difficulty, allowing adaptation to different levels of physical capacity and clinical conditions. This enables healthcare professionals to tailor exercise interventions to the individual needs of patients, including those with significant physical limitations.

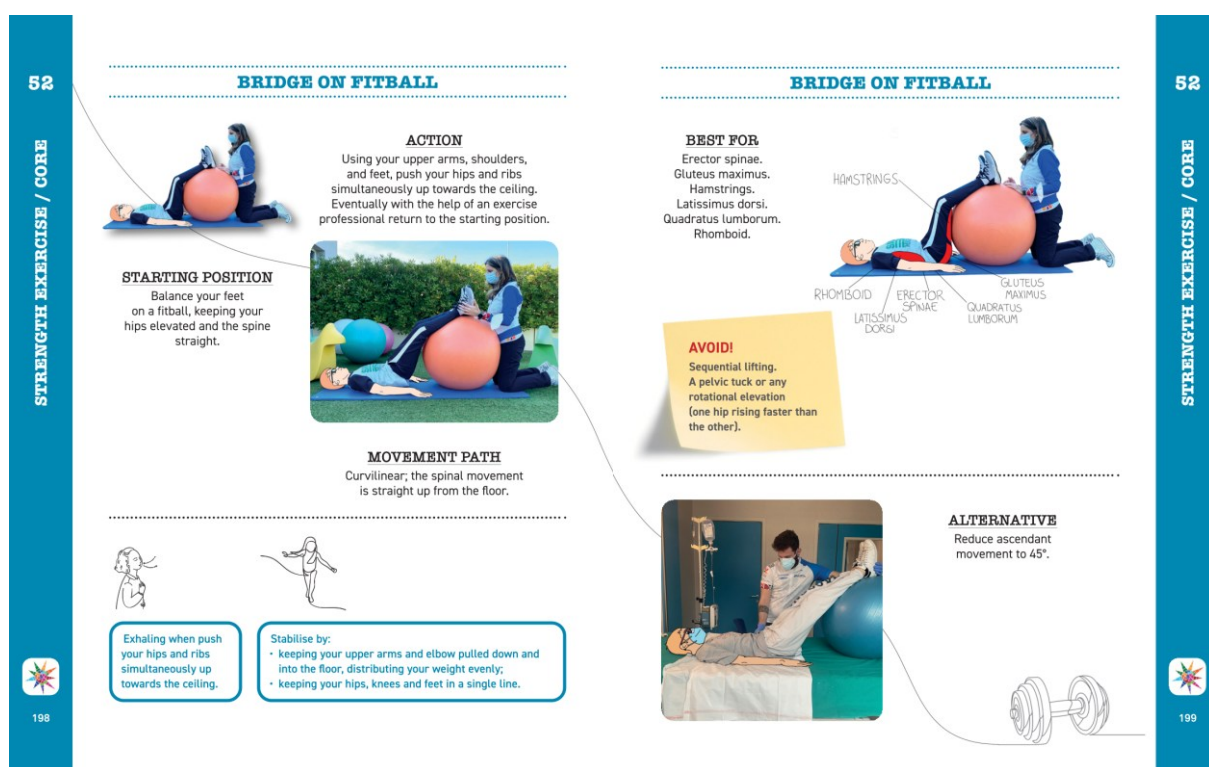


Figure 2. Example double-page spread from the **FORTEe Exercise Training Protocols** booklet illustrating the structured and standardised presentation of exercise protocols using the “Bridge on Fitball” exercise. Each exercise includes both a standard version and an adapted option for the most frail children. The booklet combines visual demonstrations, movement instructions, targeted muscle groups, safety considerations and exercise adaptations to support safe, individualised and adaptable exercise implementation in paediatric oncology settings.

In addition to these exercise descriptions, the exercise training booklet provides:

- guidance on adapting exercises to specific clinical conditions
- examples of low-resource and equipment-based training options
- playful and age-appropriate exercise formats to support engagement
- structured approaches to combining different exercise components within sessions

The complementary **FORTEe exercise testing booklet** provides standardised assessment procedures for the evaluation of physical performance and functional capacity in children, adolescents and young adults undergoing cancer treatment. It includes guidance on the assessment of exercise capacity, muscular strength, flexibility, motor performance, body composition and joint range of motion, together with safety procedures and implementation considerations for paediatric oncology settings.

Together, the two booklets combine structured standardisation with flexible adaptation, thereby supporting individualised exercise prescription, monitoring and implementation across diverse clinical environments.

4.3 Supporting implementation across clinical settings

The booklets are designed to facilitate implementation across a wide range of healthcare environments, including inpatient, outpatient and home-based settings. By covering both exercise training and exercise testing, the booklet series supports not only the delivery of interventions but also the structured assessment of patients' functional status and progress over time.

Importantly, the materials are adaptable to different levels of available resources. The inclusion of both low-resource and equipment-based training and testing options supports use across heterogeneous healthcare environments. Exercises can be performed using minimal equipment or simple tools, allowing implementation even in settings without dedicated exercise infrastructure. At the same time, the protocols can be expanded in more resource-rich environments with access to specialised equipment and facilities.

This flexibility supports a stepwise approach to implementation and aligns with the heterogeneous conditions observed across FORTEe participating centres.

4.4 Integration with FORTEe implementation experience

The development of the booklet series was closely linked to the implementation of the exercise intervention within the FORTEe clinical trial. The materials were informed by practical experience gained during programme delivery and were iteratively refined throughout the implementation process.

As such, the booklets reflect not only theoretical and evidence-based principles but also real-world feasibility considerations. They incorporate insights related to patient engagement, clinical constraints and organisational factors that influence the delivery of exercise interventions in paediatric oncology.

4.5 Dissemination and accessibility

The FORTEe exercise booklets are intended as openly accessible resources to support the broader dissemination and uptake of exercise-based supportive care in paediatric oncology.

They are provided in electronic format and are designed for wide distribution among healthcare professionals and institutions. In addition, 1000 printed copies were printed and distributed to healthcare professionals, institutions, and stakeholders across multiple European countries to support dissemination activities and facilitate implementation. Initial dissemination has taken place through

two internationally renowned pediatric oncology conferences (SIOPE Budapest 2025 and SIOP Amsterdam 2025) and professional networks, supporting visibility within the paediatric oncology and exercise sciences communities.

By providing practical, ready-to-use materials, the booklet series contributes to reducing barriers to implementation and supports the integration of exercise interventions into routine clinical practice.

5 Conclusions and Future Perspectives

5.1 Summary of key contributions

The FORTEe project represents a major European initiative aimed at advancing the role of exercise as a component of supportive care in paediatric oncology. By combining a multicentre clinical trial with extensive implementation experience across diverse healthcare settings, the project has generated valuable insights into both the potential impact and the feasibility of exercise interventions in children and adolescents with cancer.

This deliverable brings together these insights in the form of practice-oriented recommendations and supporting resources. It highlights key elements required for the successful integration of exercise into clinical care, including interdisciplinary collaboration, structured safety procedures, individualised programme design and flexible implementation adapted to local conditions.

In addition, the development of the FORTEe exercise booklets provides healthcare professionals with concrete tools to support the delivery of exercise interventions in routine practice.

5.2 Contribution to clinical practice

The findings and resources generated within FORTEe contribute to the growing recognition of exercise as a relevant component of paediatric oncology care. By translating the FORTEe experience into practical guidance and tools, this deliverable supports clinicians and healthcare providers in integrating exercise interventions into everyday clinical workflows.

Importantly, the FORTEe approach demonstrates that exercise programmes can be implemented across a wide range of settings, including those with limited resources, when supported by appropriate organisational structures and interdisciplinary collaboration.

5.3 Limitations and considerations

Several limitations and considerations should be acknowledged when interpreting the recommendations and resources presented in this deliverable. While the document is informed by current evidence, international expert exchange and extensive implementation experience gained within the FORTEe project, it does not represent a formally evidence-graded clinical guideline developed through a systematic consensus methodology.

In addition, some recommendations are based on practical feasibility considerations and expert-informed implementation experience within heterogeneous healthcare settings. Participating FORTEe centres differed substantially with regard to infrastructure, staffing and prior experience with exercise interventions, and not all implementation approaches may be directly transferable to other institutional or healthcare contexts.

Furthermore, the evidence base for exercise interventions in paediatric oncology continues to evolve, particularly regarding diagnosis-specific approaches, long-term outcomes and implementation strategies across different healthcare systems.

5.4 Future perspectives

Despite increasing evidence and growing international attention, the integration of exercise into paediatric oncology care remains inconsistent. Further efforts are required to support sustainable implementation and wider adoption across healthcare systems.

Future work should focus on:

- strengthening the evidence base through ongoing and future clinical studies
- further developing and refining implementation strategies
- promoting education and training for healthcare professionals
- enhancing collaboration between clinical, scientific and policy stakeholders
- supporting the integration of exercise into standard care pathways

In addition, continued engagement in international initiatives and consensus processes will be important to further align approaches and support the development of harmonised standards in paediatric exercise oncology.

5.5 Outlook

The FORTEe project provides a foundation for the continued advancement of exercise-based supportive care in paediatric oncology. By combining research findings, implementation experience and practical resources, it contributes to bridging the gap between research and clinical practice.

The approaches and tools developed within FORTEe may serve as a reference for future initiatives and support the ongoing integration of exercise interventions into paediatric oncology care at both national and international levels.

6 Acknowledgement and Disclaimer

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 945153.

This report reflects only the author's view and the Commission is not responsible for any use that may be made of the information it contains.

7 Annex

7.1 Annex 1 – FORTEe Exercise Training and Exercise Testing Booklets

The **FORTEe booklet series** represents a central output of the FORTEe project and are published under CC-BY-Nc-Sa 4.0 license.

Exercise training booklet

Title: *Precision-based exercise training protocols in children with cancer – pediatric oncology*

Authors: Lanfranconi F., Corti E., Konda B., Zardo W., Moriggi T., Dreismickenbecker E., Neu M., Fiuza Luces C., Lucia A., Faber J., & Balduzzi A.

Format: electronic booklet (e-version)

Accessibility: freely available (open access)

Target audience: healthcare professionals in paediatric oncology

DOI: <https://doi.org/10.5281/zenodo.20055071>

ISBN 978-88-3283-529-8 (print)

ISBN 978-88-3283-532-8 (pdf)

The exercise training booklet provides structured exercise protocols, graded exercise options and practical guidance for the implementation of individualised exercise interventions in children and adolescents with cancer.

Exercise testing booklet

Title: *Exercise Testing Protocols in Children with Cancer*

Authors: Lanfranconi F., Zardo W., Moriggi T., Corti E., Dreismickenbecker E., Neu M., Fiuza Luces C., Lucia A., Balduzzi A., & Faber J. on behalf of the FORTEe Consortium

Format: electronic booklet (e-version)

Accessibility: freely available (open access)

Target audience: healthcare professionals in paediatric oncology

DOI: <https://doi.org/10.5281/zenodo.22115416>

The exercise testing booklet provides standardised procedures for the assessment of physical performance, exercise capacity, muscular strength, flexibility, motor function, body composition and range of motion in children, adolescents and young adults undergoing cancer treatment. In addition, it includes standard operating procedures addressing safety, infection control, emergency procedures and implementation requirements for exercise testing in paediatric oncology settings.

7.2 Annex 2 – Scientific Publications

A list of scientific publications generated within the FORTEe project is provided below.

Key publications:

- 1) Neu, M. A., Dreismickenbecker, E., Lanfranconi, F., Stössel, S., Balduzzi, A., Wright, P., Windsor, S., Wiskemann, J., El-Rajab, I., Lucia, A., Fiuza-Luces, C., Mongondry, R., Fridh, M. K., Spreafico, F., Konda, B., Kitanovski, L., Heißerer, B., Polak, M., Baader, T., Bloch, W., ... FORTEe Consortium (2025). **Get strong to fight childhood cancer - an exercise intervention for children and adolescents undergoing anti-cancer treatment (FORTEe): Rationale and design of a randomized controlled exercise trial.** BMC cancer, 25(1), 1275. <https://doi.org/10.1186/s12885-025-14489-y>

- 2) Neu MA, Dreismickenbecker E, Wypyrsczyk L, Spreafico F, Balduzzi A, HeiBerer B, Marriott H, Paul NW, Watson E, Bloch W, Fridh MK, Götte M, Kitanovski L, Konda B, Lucia A, Mongondry R, Rizvi K, Larsen HB, Bauer N, Beller R, Fiuza-Luces C, Gauß G, Kühn M, Moriggi TP, Pérol O, Olivier F, Ravnik D, Rován M, Santana-Sosa E, Stefanović M, Wright P, Zardo W, Lanfranconi F, Wiskemann J and Faber J (2026) **Implementing exercise interventions in pediatric oncology: an expert consensus framework from the FORTEe project.** Front. Oncol. 16:1893935. <https://doi.org/10.3389/fonc.2026.1893935>
- 3) Francesca Lanfranconi, Elias Dreismickenbecker, William Zardo, Tommaso Moriggi, Emanuele Villa, Giorgia Radaelli, Eleonora Corti, Linda Peli, Marie A. Neu, Mareike Kuehn, Lena Wypyrsczyk, Carmen Fiuza-Luces, Alejandro Lucia, Miriam Götte, Martin Kaj Fridh, Lidija Kitanovski, Barbara Konda, Hayley Marriott, Rodolf Mongondry, Filippo Spreafico, Joachim Wiskemann, Adriana Balduzzi, Joerg Faber (2026). **Precision-Based Exercise Protocols for Children with Cancer: A Methodological Approach from the European FORTEe Research Project.** Frontiers in Pediatrics, accepted for publication on 13 August 2026. [10.3389/fped.2026.1907775/abstract](https://doi.org/10.3389/fped.2026.1907775/abstract)

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