



Project number: 2020-1-PL01-KA203-082292

# Report on focus group sessions results



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#### 1. Introduction

#### **ASSUMPTIONS**

The three focus group sessions with external experts in the field of gait physiotherapy from countries: Poland, Germany and Italy, is next to questionnaire survey, the key research part of the first Intellectual Outputs (IO1) titled "Curriculum definition of SMARTherapy+ tool" within the SMATherapy+ project. The aim of IO1 is development of substantive, methodological and technical sides related to SMARTherapy+ educational tool.

The Curriculum is a comprehensive description of innovative training tool for gait physiotherapy. Innovations of this tool are located in following areas:

- The training contents that are based on the real case studies of gait physiotherapy treatment particularly taking into account: various etiology of gait abnomalies and various age of patients (meeting the demand for USEFUL KNOWLEDGE).
- The training contents are presented in user friendly way with the use of various graphical methods like videos, images, schemas ect., (meeting the demand for ACCESSIBLE KNOWLEDGE).
- The training contents are widely available because of sharing knowledge via online training platform (meeting the demand for NON-EXCLUSIVE KNOWLEDGE).

The definition of the curriculum should include following items:

- Learning objectives of the course that fit to the recognized educational needs in physiotherapy of gait.
- Course structure and specification including division of modules, units, characteristic of knowledge, skills, competences to achieve.
- Learning methods and forms applied to achieve the defined learning objectives with special emphasis on using ICT and VR technologies.
- Recognition framework including criteria for standardizing learning content and achieving learning outcomes at the level of the European Qualifications Framework.

#### **OBJECTIVES**

The Focus group sessions were organized with participation of experts from gait physiotherapy to identify the main objectives, procedures and possible structure of SMARTherapy+ tool as well as personal and institutional target group preferences. The idea was to gather expert knowledge from different European countries in order to create training tool covering educational needs around the European Union. Particularly the













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experts from different coutries indicated possible set of case studies to be developed as a key component of the SMARTherapy+ tool's content.

Taking into account the assumptions described above, the following general objectives of the focus group session have been established:

- To identify the main objectives, procedures and possible structure of SMARTherapy+ tool
- To recognise a personal and institutional target group preferences.
- To recognise the desired **types of case studies** that should be developed within the training materials including possible scenarios of gait physiotherapy protocols.
- To define the **educational needs** in gait physiotherapy around EU countries.
- To characterize the **current knowledge and background** of health professionals, especially those related with physiotherapy in gait.
- To identify the **knowledge areas required** for the application of new technologies in the gait physiotherapy.
- To assess the interest in the training topics.

The focus group session outcomes are crucial for developing curriculum description that reflects the real educational needs in gait physiotherapy domain in Europe.

#### **METHODOLOGY**

The whole methodology of focus group survey was divided into four main stages:

- 1st stage was defining interview questionnaire.
- **2**<sup>nd</sup> **stage** was organizing sessions of focus group in three countries: Poland, Italy and Germany including invitation of experts in gait physiotherapy and setting up the meeting.
- 3<sup>rd</sup> stage was conducting focus group sessions with the use of interview questionnaire.
- 4<sup>th</sup> stage was to analyze experts' responses and develop survey report.

The specific guide that contains substantive and formal requirements was developed in order to conduct focus group sessions in three countries in the same universal way (Annex 1).

Particularly the guide structure is following:

- General information on focus group technique
- Project description
- Objective of the focus group session
- Recommended profile of the participants













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- Human resources
- Material resources
- General Data Protection Regulation (GDPR) information clause
- Development of the session
- Interview questionnaire

#### INTERVIEW QESTIONNAIRE STRUCTURE

The interview questionnaire contained 7 general topics that were the fundament for discussion among physiotherapy experts:

- 1. The most common gait pathologies in the practice.
- 2. Characterization and systematization of knowledge about patients who are advised by specialists in gait physiotherapy.
- 3. The most difficult case or cases in gait physiotherapy.
- 4. New methods, techniques, tools over the last 10 years
- 5. Needs for knowledge that is crucial for improving gait protocols of patients.
- 6. Issues that were only briefly discussed in the education process (studies) or were only discussed theoretically, but from the perspective of the current work experience are considered as important and necessary.
- 7. The strengths and weaknesses of online training in gait physiotherapy.

#### 2. Time, place and conditions of focus group sessions

NOTE! Because of public character of this report and taking into account General Data Protection Regulations (GDPR), the document does not include photos and names of experts participating in the sessions.

The detailed information about time, place and conditions of conducting focus group sessions is included in the table 1.













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#### Table 1. Time, place and conditions of focus group sessions with division for 3 countries

	Poland	Germany	Italy
Organizer	SUT & AWF	UzL	FPM
Date	April 13, 2021 from 7pm to 8pm	June 17, 2021 from 6pm to 7pm	June 7, 2021 from 2pm to 3.30pm
Place	Online meeting because of COVID	Online meeting because of COVID	Online meeting because of COVID restrictions with
	restrictions with the use of zoom.us	restrictions with the use of WebEx meetings	the use of Microsoft Teams conference platform.
	conference platform	conference platform.	
The number	6 including moderator of the session,	6 including moderator of the session,	6 including moderator of the session, observer and
of	observer and experts in physiotherapy	observer and experts in physiotherapy.	four experts in physiotherapy
participants			
Profile	1) Physiotherapy specialist; owner of	1) MSc: physiotherapist and lecturer at the	1) Head of LAM - Motion Analysis Laboratory
descriptions	the rehabilitation centre "REHA-	Universität zu Lübeck. She has a	(Rehabilitation Dep.) · AUSL-IRCCS Reggio
of the experts	MED" in Żywiec. He completed	special focus on neurorehabilitation and	Emilia. MSc degree in Rehabilitative Sciences
	numerous courses and trainings,	teaches students in gait analysis and	and a Ph.D. in Clinical & Experimental
	among which the most important	gait therapy. She developed the gait	Medicine. Since 2004, she is in charge of the
	were: Fascial Manipulation, PNF,	analysis course concept "Auf geht's" in	Motion Analysis Laboratory of the
	NDS Neurodynamic Solutions,	2010 and has been giving freelance	Rehabilitation Department of the Azienda USL-
	Performance Stability, Method of Dr	courses for medical professionals ever	IRCCS of Reggio Emilia, Italy, where she
	Ackermann's Method, Outline of	since.	developed strong expertise in the use of the
	Scoliosis Treatment with Lehnert-		instrumental assessment of human motion in
	Schroth Method, Kalterborn/Evjanth	2) DiplMedPäd.: physiotherapist and	the rehabilitation pathways of neurological
	Concept, Plaatsman Concept of	lecturer at the Akademie der	patients. Over years, she published both
	Manual Therapy in Mechanical	Gesundheit Berlin/Brandenburg e.V.	methodological and clinical studies on this













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Examination and CranioSacral Therapy. In addition, he participated in the training course "Functional Physiotherapy in Shoulder and Knee Joint Injuries" organized by Rehalab Academy and completed the Scientific Training Course "Knee Joint".

2) Physiotherapist since 1993; Silesian Provincial Consultant Physiotherapy: Head of the Rehabilitation Department of the Public Independent Provincial Hospital for Trauma Surgery in Piekary Śląskie, Poland. He completed courses in: Neurorehabilitation by "Neurac" method, treatment of scoliosis by FED method, neurorehabilitation course by PNF method, manual therapy course bγ Kaltenborn/Evjenth method stages), manual therapy course by Plaatsman (3 stages). He mainly She is a specialist in musculoskeletal physiotherapist with a special interest in gait therapy.

- 3) MSc: she has 15 years of clinical work experience in hospitals physiotherapy practices, especially in field of rehabilitation neurological ailments. She is researcher at the University of Lübeck and, since 2017 a PhD student at Charité-Universitätsmedizin Berlin. Geriatrics Research Group. Her research interests are in the area of gait analysis and variables that influence human gait, such as fear of falling.
- 4) 30 years of clinical experience as a physical therapist. She works mainly in neurological early rehabilitation with severely craniocerebral injured patients. She is currently head of the training center at RehaNova Köln Neurologische Rehabilitationsklinik GmbH, in Cologne Merheim. In addition,

topic, receiving four SIAMOC-Elsevier best paper awards. Currently, she is managing research projects focused on the contribution of EMG and instrumental assessment of movement in promoting appropriateness in rehabilitation. Moreover, she is providing methodological support to other research activities of the rehabilitation department, which are strategic in terms of cost-effectiveness, including clinical trials, fall risk assessment in rehabilitation, and self-care activities after discharge from hospital to home. She has been a contract professor at the University of Modena and Reggio Emilia, Faculty of Physiotherapy. Currently, with the Italian Society of Motion Analysis in Clinics (SIAMOC), she is a member of the Directive Board and in charge of the teaching and training activities in Italy.

 Head of Motion Capture Laboratory of the University of Trieste, Trieste (UNITS). Temporary Researcher at Dept. of Neuroscience, Rehabilitation, Ophthalmology, Genetics and Maternal Child Health, University













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treats	patients	with	lower	limb
injurie	s directly	after su	ırgery i	n the
early	recovery	period	in ord	er to
restor	e their full	or high	nest phy	/sical
fitness	3.			

she is a Bobath instructor who has been giving Bobath basic courses throughout Germany for 10 years.

of Genoa. Physiotherapist, Ph.D in Neuroscience and Cognitive Science, teacher in the Physiotherapy university training course at University of Trieste, past - president of the working Group on Neurosciences inside the National Italian Association of Physiotherapy (AIFI).

3) Associate Professor, Dept. of Neuroscience, Rehabilitation, Ophthalmology, Genetics and Maternal Child Health, University of Genoa. She is graduated in Sciences of the health professions and Rehabilitation at the University of Genoa, wherein 2011 she obtained a Ph.D. in Neuroscience with a thesis entitled: Neurophysiological bases involved in the rehabilitation of extrapyramidal syndromes. Associate professor at the University of Genoa. research interests concern development of new rehabilitation protocols in the neurological field and the study of neurophysiological mechanisms related to motor learning. Since 2011, she has been a reviewer for scientific journals; she is a member of the Editorial Board of the following journals:













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Archives of Physiotherapy, Frontiers in Neurology and Frontiers in Neurorehabilitation and Scienza Riabilitativa

4) Head of the Movement Analysis and Robotics Laboratory, "Bambino Gesù" Children's Hospital, Rome. He obtained the Rehabilitation Therapist title in a three-year course at the "Spolverini" Hospital in Ariccia. Subsequently, he obtained a degree in Rehabilitation Sciences at the University "Tor Vergata" in Rome. He holds a doctorate in Science, Technology, and Space Measurements, specialization in Mechanical Measurements for Engineering, at the "Giuseppe Colombo" University Center for Space Studies and Activities - CISAS in Padua. He was employed for 15 years in a center for adult neurorehabilitation in Rome, until 1999. He is in charge of the Movement Analysis and Robotics Laboratory at the "Bambino Gesù" Children's Hospital - a research institute in Rome. He patented a dynamic orthoses system for gait recovery in 1995 and a robotized modular exoskeleton in 2012. He ideated a 3DoF platform balance robotized for













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	assessment and training in 2006. It realizes a
	Dynamic Oriented Rehabilitative Integrated
	System (DORIS), mixing a 6DoF Stewart
	platform with movement analysis virtual reality
	and exoskeletons, not yet patented. He was the
	PI and collaborated in many research projects
	concerning assessment and technological
	rehabilitation. He is a clinician progressively
	introduced in the research context.













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#### SUMMARY OF THE EXPERTS' OPINIONS ON THE TOPICS INCLUDED IN THE INTERVIEW QUESTIONNAIRE – POLAND

In the table 2 particular topics and answers of physiotherapy experts from Poland, Germany and Italy are presented.

The first column named "Index" in the table contains a number of particular question or topic that was a subject of discussion and covers the topic according to following index:

- T1 An opinion about the most common gait pathologies and an attempt to characterize the patients who seek specialist advice in gait physiotherapy (are they patients with specific diseases; civilization diseases; do the gait problems result from an abnormal lifestyle; are they elderly people etc.?)
- T2 Description of the most difficult case in gait physiotherapy and present possible difficulties and barriers in managing such a patient. What support do you use at that time: literature, consultation with other physiotherapy specialists etc.
- T3 Is the number of patients with gait problems increasing? Are they usually patients with a condition that requires immediate or continuous physiotherapy?
- T4 Has the issues of gait physiotherapy been expanded with new methods, techniques, tools over the last 10 years. In what direction is gait physiotherapy developing? (Regarding the development and use of modern technologies in practice and education; how would you rate the accessibility to these technologies).
- T5 An attempt to answer the question of what knowledge is not imparted in the process of education (studies) and requires supplementation on your own through courses, training, literature, etc. in order to be able to manage patients at the highest level.
- T6 What issues have been briefly discussed in the education process or have been discussed only theoretically, and from the perspective of your current work experience, you consider important and necessary.
- T7 What do you think online gait physiotherapy training should include to be effective and meet the needs of physiotherapy professionals. List the strengths and weaknesses of online training.













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Table 2. Experts' opinions on educational needs in gait physiotherapy

Index	Polish experts	German experts	Italian experts
T1	Patients who come to a physiotherapist are	Experts agree that pathologies (=diseases) are	The participants expressed their opinions on the
	characterized by the increasing awareness of	not a good way to classify gait pathologies. These	basis of their professional experience mainly
	the need to achieve the correct gait in order to	should rather be classified using observed gait	obtained by working in hospital and centers
	be able to actively participate in social life and	patterns such as Trendelenburg, Duchenne,	equipped with movement analysis laboratories,
	recreational or sport activities.	medial collaps or the observed deficits such as	where they carry out the physiotherapy activity
	It can be stated that the number of patients	knee extension deficit. Such patterns can be	to treat patients with different locomotion
	receiving such advice is increasing and that <b>the</b>	observed in a variety of very different	deficits. They agree that the evidence on which
	patient profile is changing.	pathologies.	type of treated patients are recurrently
	There are more and more patients who want		assessed during the therapy is driven by two
	to achieve the best possible fitness level	Patients range from musculoskeletal (e.g. knee	main factors: the pathology itself and the local
	through rehabilitation and their strong	or hip pathologies), post-surgical to neurological	therapy services offered by the national health
	determination often leads them to return to the	such as foot dorsal extension paresis, lack of	system. While the first factor has a more
	condition they had before the injury or	knee muscle stabilization, decreased extensibility	objective and scientific feature, the second
	operation.	in hip and knee joints and therefore deviations,	factor is affected by different regional
	In addition, it should be noted that a <b>detailed</b>	hypermobility related deviations hyper- or	regulations that can vary even locally across the
	interview with the patient allows the	hypotonus of the musculature, across all age	country.
	physiotherapists to obtain a lot of important	ranges including children and geriatric patients	Concerning adult population, typically
	information that affect the way of dealing	where observations could include reduced	persons undergoing physiotherapy are
	with the patient. For example, the interview	cadence or increased step width or insecure gait.	elderly people ( >65 years old), with gait
	can detect important facts from 15-20 years ago		anomalies either related to normal aging
	when a patient had a foot injury. This or other		weakness, or related to neurological diseases













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	facts like previously acquired minor injurie	as in	(stroke, traumatic brain injury), as well as
			,
	the lower limb may have a direct impac	it on	patients with degenerative diseases (Parkinson,
	current gait pathologies.		Multiple sclerosis).
			Regarding <b>pediatric patients</b> , they fall into two
			main groups: children with neurologic
			pathologies and children with specific diseases
			often linked to gender or genetic conditions, or
			obesity.
			Regarding the issue related to the public
			service, typically patients seek for objective
			assessment-based physiotherapy because of a
			direct interest, or following the indication of a
			medical doctor or the own physiotherapist.
			Participants agree that an appropriate
			preliminary diagnosis of the patient is
			fundamental to better define the assessment
			and therapy needs of the patient which
			would improve greatly the following
			rehabilitation process and to efficiently
			tailor specific treatment programs.
			Improper lifestyle does not appear to be a
			common cause to undergo physical therapy.
T2	Expert 1. Case description:	Expert 1. Case description:	As a general opinion, according to the experts,
			the gait function appears complex and only













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10 year old girl; lower leg injury; one ankle fractured; cast on for 4-5 weeks; everything healed; muscle strength returned to normal; reduced support time on limb that was in cast; despite visits to multiple specialists, she could not get rid of the abnormality. The expert focused on gait re-education and on learning to increase the duration of support on the limb where the injury occurred. dedicated/personalized set of appropriate exercises was developed for her to perform at home. After one week, improvement could be seen and the subsequent consultation confirmed this.

#### Expert 2. Case description:

The difficult cases that are most often remembered are **lower limb amputee patients with hip dislodgement.** This is a group of patients who want to move, want to be independent and move symmetrically. This is largely achievable because the adaptive capacity is very high.

The representative problems are ACL reconstruction, lack of knee extension.

I cannot think of a specific case but I always find it difficult to work with neurological patients who have a lack of trunk stability.

#### Expert 2. Case description:

I remember an incomplete paraplegic patient with an extremely high muscle tone. Without appropriate medication, gait therapy also with the help of **supportive devices** like Orthoses and device assisted therapies like an exoskeleton was impossible. In this case a close interprofessional communication was the key to successful gait therapy.

Expert 3. Case description:

My patient had Guillain Barré Syndrome and was very tall, I am rather small. This descrepancy in size made it very difficult to treat him while walking. My only option was to use the the walkable device.

Another difficult situation can occur when **treating athletes**. Their dysfunction are usually very small and difficult to detect but may influence performance in elite sports to a large extent.

**a few pathologies can be considered** 'simple'/typical. According to the experts, to be more precise, this complexity is related not only to the pathology, but to the specific expression of the pathology in each target patient, so not only the therapy approaches can be different but also the options to be chosen for a specific rehabilitation treatment can be many.

Practically, there are two possible scenarios in which higher difficulty levels are perceived by the experts: in the 1<sup>st</sup> scenario, the pathology is known, but during treatment the patient is not obtaining the expected results; in the 2<sup>nd</sup> scenario, the starting diagnosis is complex and the impact of the pathology is not well known.

The 1<sup>st</sup> scenario is frequent, for example, in patients wearing prostheses, and in these cases the physiotherapy professional asks the surgeon for advice or discuss with the medical specialist about possible causes.

For the 2<sup>nd</sup> scenario, a check of known protocols is mandatory and a meeting with the neurologist or other medical specialists is generally scheduled to discuss about such specific patients. This further in-depth analysis often













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	Example: a young patient, unable to straighten		could suggest alternative assessment
	his knee, decides to have surgery because of		methodologies for gait analysis, useful to
	his desire to participate in recreation. The		identify new factors and issues not considered
	procedure was performed correctly and the		before.
	patient is restored to function.		As barriers in the patient management, the
	Another flagship issue is endoprosthesis and		following ones were recognized in the context of
	possible complications to deal with.		public assistance: the limited tools/instruments
			available for better performing the
			physiotherapy activity, the limited number of
			sessions that can be provided for each patient:
			in effect, the number of physiotherapy sessions
			that can be provided is established by the
			National Health system, but this number is
			variable from region to region, and in some
			cases it may be insufficient for a target
			pathology. Finally, the priority in accessing to
			the services provided in rehabilitation
			structures/laboratories is typically higher for
			elderly people, whose treatment are carried out
			firstly than in the young patients.
T3	According to each of the experts, the number of	According to all experts, the number of patients	
	patients using physiotherapist services is	using the services of physiotherapists is	
	increasing which is connected to the growing	increasing, which is associated with the growing	
	awareness of the patients about seeking	awareness of patients to find solutions to improve	
	solutions to improve the quality of life in social,	the quality of life in the social, professional and	













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occupational and recreational range. This awareness allows to associate many pains disorders with incorrect gait. Such patients constitute a new group of recipients of gait physiotherapy services.

To sum up, according to experts, it is important to remember that physiotherapy is essential for the healing process both after injuries, surgeries as well as resulting from disorders in different stages of development. This approach clearly confirms the fact that the number of patients with gait problems is increasing.

recreational spheres. Basically, no gait therapy is specifically prescribed. So that the physiotherapists recognize gait problems in your therapy and treat them with. This awareness makes it possible to associate many pain disorders with incorrect gait. Such patients constitute a new group of recipients of gait physiotherapy services.

To sum up, according to experts, it is important to remember that physiotherapy is essential for the healing process both after injuries, surgeries as well as resulting from disorders in different stages of development. This approach clearly confirms the fact that the number of patients with gait problems is increasing.

According to experts, a lot has changes over the last 10 years in terms of the tools and equipment used in working with patients with abnormal gait. Many products saturated with electronics have appeared on the market which, in their opinion, to a certain extent, provides support in the rehabilitation process. They then pointed out that the large amount of data that a physiotherapist obtains from these

The experts point out that even though the new technologies can be great supports, most of them lack the space to accommodate them.

They also stated that it is more common to use standardized documentation forms.

In the last 20 years, physiotherapy practice has increased its scientific nature. The attention of the physiotherapy professionals has been moved to more scientific, evidence-based approaches, and the implementation and use of instruments (in particular sensors) to get quantitative assessment data have risen, allowing to analyze the effects of different diseases on locomotion, and to monitor the



T4











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devices is often problematic in interpreting the results. In addition, the use of instrumentation causes the patient to focus on the mechanics of exercise itself but without concentration on the proper pattern of gait, which is undesirable.

To sum up, the experts are in favour of using modern technologies in the process of working with patients with gait pathologies but only when the physiotherapist can see the benefit for the patient in their use and can draw conclusions from the obtained data. Moreover, they are able to motivate the patient to consciously correct their gait pathology, not concentrating only on the 'mechanical effect' of the exercise. The presence and approach of the physiotherapist is crucial here.

progress and the evolution of the therapy. This deep change, combined with the emergence of a specialization in physiotherapy -from being in the past a general discipline, it moved toward always more specific therapy approaches-, currently allow to provide ad hoc physiotherapy to treat a wide spectrum of gait disorders. In such a context, the "gait analysis—approach" used to collect instrumental data to better understand the deficits to be treated, is increasing its use and becoming an essential tool to define the proper physiotherapy approach to address specific gait disorders.

At the same time, nowadays the available methodologies to address specific pathologies are always more robust and being used widespread.

The number of patients has been growing during the last years, firstly due to the increase of elderly people and the average age of the population, an increase of patients living with chronic conditions. The patients seeking for physiotherapy increased also due to the greater awareness on physiotherapy (mostly in the sports sector, not only for sport professionals)













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_				
				and on the general sensibility on prevention of
				gait anomalies.
				Concerning the future development of
				physiotherapy, experts agree that one probable
				direction is to expand the knowledge on
				physiotherapy methodologies and to increase
				the understanding of gait pathologies,
				supported by the use of modern instruments
				able to uncover the root cause of gait
				anomalies.
	T5	The first expert believes that when it comes to	According to the experts, different resources are	The issue related to the educational process is
	T6	visual techniques he uses them in his own	used. They cite above all the collegial exchange	linked to different factors related both to the
		professional practice. When working with a	between the same professional group and also	public educational system and to the natural
		patient, he uses the technique of image	others as a helpful source. One expert state that	evolution and progress of knowledge on
		recording through a very simple solution -	she would consult orthopedic mechanics.	physical therapy topics.
		recording the patient's gait with a cell phone.	Especially when it comes to stabilizing the foot.	First of all, experts point out that standards for
		He then presents the video footage to the	Another expert also states that it can be helpful to	training are not harmonized among the different
		patient. The patient being able to recognize the	attend a continuing education course in order to	EU countries: in Italy, as in some other
		differences between a correctly functioning limb	acquire expert knowledge and to build up a	European countries, the physiotherapy degree
		and a limb with the abnormal gait on his own	network of people who are equally interested. But	is a 3-years training course, while in some other
		example is more determined to work at home	basically, they formulate that the visualization of	countries 5-years courses are provided. This is
		and follows the rehabilitation exercises as well	the gait with the help of videos has increased	the first barrier to harmonize the knowledge and
		as executes them systematically. The patient is	and so also a gait analysis is better possible.	competencies expected to be transferred
		often not aware of his own gait pathology.	As a basic work Perry with her concept of 1982 is	among EU physiotherapy students.
			mentioned, which provided for a uniform	













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The expert thinks that visual techniques illustrating the differences between the abnormal gait and the normal gait are very useful, and normal gait are very useful in the process of educating future physiotherapists. One of the examples showing the differences between correct and incorrect gait is the example of using the shape of the patient's shoes for assessment.

The second expert agreed with the above conclusion. He then cited the so-called truth of life: you can read 100 times, see 10 times, and touch 1 time. He believes that the course of studies should emphasize working with patients and ensure that students have access to clinical cases and direct contact with them. He then suggested that students should also be taught to extend the interview to other approaches such as asking the patient for their shoes, as this is also a source of knowledge about how the patient walks and what abnormalities they have in their gait.

Summing up, he stated that in the process of education, **emphasis** should be put on the

nomenclature of e.g., Loading response and Initial contact.

In summary, the experts state that, apart from all other possibilities, the exchange between colleagues is used the most.

One expert mentions that practical practice is lacking for students. In class, she can teach the basics of gait analysis, but there is not enough time for practice to develop the skills of analysis. It means that the analysis is not only superficial, naming the gait phase where something is wrong, but that it also goes into depth and names the muscle or joint etc. that could be the cause. Videos of different patient examples can be relevant here, e.g., different patient videos in the field of neurology, orthopedics, pediatrics, etc. In addition, they see it as relevant to be able to apply and use the knowledge of gait analysis again and again in all subjects in order to increase the transfer of knowledge.

In summary, it is necessary to establish the basis and then practice analyzing the gait in different areas (orthopedics, neurology, etc.). For this

As a second issue, the **update of teachers in terms of emerging modern technologies** to support gait analysis should be also fundamental.

Focusing on Italian university training courses, experts agree that biomechanical gait analysis appears to be not widespread and they agree on the importance to increase greatly the knowledge on gait analysis to support the clinical practice, and to present the modern technologies and available instruments.

In addition, some basic theoretical contents on gait physiology and physiopathology are perceived as important. Some changes in such a direction are already on the move in Italy, but there are still some gaps.

Currently, in Italy, the university training course (3 years) aims to transfer basic competence, then fee-paying specialization courses (outside the university) are available to increase own competencies and get in-depth knowledge on specific topics.

Focusing on current Italian professionals already practicing in the gait physiotherapy













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contact between the student and the patient, and visual techniques should be treated as a form of supplementing their knowledge and at the same time being a support in the teaching process.

purpose, gait or gait analysis should be taken up again and again in all possible teaching subjects, if possible, and practiced using **patient videos**, among other things. area, experts agree that they should update their knowledge (in terms of human biomechanics and modern technologies) and increase their sensibility to improve their skills thank to the use of new movement analysis methods (for instance by using inertial sensors) aiming to be more proficient in their approaches.

As a final remark concerning the modern gait analysis and the needs of competencies this approach arises, the following issues have been highlighted:

- ideally, a physiotherapy should understand which is the most significant parameter to be analyzed in each particular situation (instead of analyzing all possible parameters that can be collected, a very time-consuming approach), this is essential in order to efficiently monitor treatment progress.
- the emergence of many data and information related to gait analysis pushes the need to transmit to the modern physiotherapy professional also competencies and skills to distill and recap













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T7	Online training should be based on the effect of
	authenticity, pointing to real cases of gait
	pathology and physiotherapy scenarios
	tailored for them. The materials should be
	developed on the basis of comparability of
	pathological and healthy gait - preferably by
	overlaying graphic images representing both
	cases.
	The advantage of online training is open and
	unrestricted access to valid, recent and proven

knowledge in gait physiotherapy.

The disadvantage of online training is the lack of patient contact. Online training should be an important complement to hands-on learning based on patient work.

The greatest challenge in teaching gait is to make the basis of walking tangible. Thus, the opinion of the experts is that the introduction to the subject should take place in presence. The additional case-based exercises with the videos can be done in an online format. Here, the focus should be on the individual gait pathologies and preferably on the pathologies in the individual gait phases.

Online training should be based on the effect of authenticity, pointing to real cases of gait pathology and physiotherapy scenarios tailored for them.

The advantage of online training is unrestricted and easy access worldwide. The online format offers the possibility to visualize basic knowledge through visualization, anatomy and biomechanics of each gait phase with the help of videos of people and patients or computer calculated images. The disadvantage of online training is the lack of hands-on patient contact.

the acquired data, in order to be proficient in taking the decision on which treatment is the more appropriate to be implemented.

During the last months, some of the experts involved in teaching have had the opportunity to implement online training courses. Moreover, some of them have a long experience in providing online training also before the pandemic period.

In general, the experts agree that the online approach can be proficient for theory lessons for students, for the exchange of conceptual issues between experts, and for some levels of training (the entry-level). However, the online approach to transmit practical contents appears to be inadequate, if based on current online platforms, due to different factors:

- Current online platforms appear to be not enough user-friendly for training physiotherapy professionals;
- Yet the implementation of videos, engagement tools could be adequate for theoretic learning (for university students), but not for training on practical topics (and so for already expert professionals);













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professional participants, the professional participants participants, the professional participants p	ractice
similarly, the interaction between teachers and the professional	
teachers and the professiona	tance;
	en the
	s, the
availability of a laboratory	with
instruments appear fundamental	
- For young students, after	earning
conceptual lessons, it is needed to	get into
contact with the patients in the lal	oratory
environment, this is essential to	levelop
the necessary sensibility;	ļ
- Currently, "virtual patients" ap	ear to
be far from the behavior of the re	al one.













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### 3. THE MAIN CONCLUSIONS FOR DEVELOPING CURRICULUM DEFINITION OF SMARTHERAPY+ TOOL

Taking into account the interview outcomes and summary points included in the table 2, the important findings affecting curriculum definition are presented in this section. In the same time these findings cover the general objectives of the focus group session expressed in "Objectives" section of this Report document.

#### The main **objectives**, **procedures** and **possible structure** of SMARTherapy+ tool

- The main objective of SMARTherapy+ tool is to provide practical and ease to interpret and understand knowledge about gait physiotherapy as a supplemental material next to traditional study process of gaining practical skills with participation of real patients. It should be complimentary material for the learning process involving real therapeutic cases and real patients registered before, especially when it is not possible to work with patients. The training material should reflect as closely as possible specific procedures with specific types of gait pathologies.
- At the very beginning, it is useful to show a video depicting a "normal" gait in all its phases and to address all the biomechanical and anatomical prerequisites of each phase. It's stated that it is also possible to have two videos. One with computer-calculated skeletonized persons with is next to the other video of the living person in the hallway to make it even more vivid. Here, angular positions of joints can be perceived more easily. In this way, the computer-calculated video and the video of the same person not computer-calculated can also be superimposed.
- The videos should be prepared according to gait pathologies. Since, for example, a stroke can have hyper- and hypotonus, resulting in different gait abnormalities. Another possible presentation can be to record videos for pathologies of the individual gait phases and analyse them. It would be helpful if each video could show only one gait deviation.
- After watching the videos, hypotheses should be generated as to what could be the
  cause of the pathology. This is followed by the planning of a structured examination
  with the consideration of which tests have to be performed in order to map e.g. a
  muscle weakness. And this is done for each individual gait pathology and later
  increasing the videos in complexity so that multiple pathology occurs in one video.
- A training on gait physiotherapy not only will be fruitful for the daily practice of many professionals, but also will enable those who have not had the opportunity to learn about this topic to enhance their skills for reaching the same competencies level of other colleagues across Italy. In effect, biomechanical gait analysis appears to be not widespread and the experts agree on the importance of gaining skills in gait analysis, the modern technologies and available instruments to support the clinical practice.













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 The development of new training tools is also in accordance with the experts' opinion that current learning platforms have several limitations to effectively teach these topics.

#### To recognise a personal and institutional target group preferences.

- The SMARTherapy+ tool can be dedicated to all institutions and people involved in creating learning standards in physiotherapy, also to teachers and students of physiotherapy domains as well as practitioners.
- The university students and professionals not skilled in gait physiotherapy are two main different target groups with similar educational gaps in this topic but, from time to time, with different professional interests, and consequently, training needs:
  - For advanced training levels targeting more skilled professional participants, improving daily practice becomes of great importance; in this case, the interaction between the teachers and the professionals appear fundamental, as much as the availability of an equipped laboratory;
  - For young students, after learning conceptual lessons, it is important to highlight that certain levels of perceptual learning are also necessary to acquire specific skills.

#### To recognise the desired **types of case studies** that should be developed within the training materials including possible scenarios of gait physiotherapy protocols.

- It is suggested to develop audio-visual material containing abnormal gait and then superimposing normal gait over it. In this way, it will be possible to present to the students in a clear way the difference between the position of the limb in each parameter, as well as to draw their attention to the key points in abnormal gait, which are most important in the process of gait re-education.
- Different cases should be taken into consideration including age, type of disorders in order to create possible wide spectrum of cases patterns.
- It is needed to provide an in-depth knowledge of the physiology of normal walking, believing that this knowledge is essential to understand gait deficits and acquire skills in recovery from pathological gait.

#### To define the **educational needs** in gait physiotherapy around EU countries.

- To learn gait patterns and possible anomalies according to audio-visual methods; how to use personal devices like smartphones to identify anomalies in gait. Learn possible scenarios of protocols according to type of identified gait pathology.
- To learn the roles of the physiotherapist and the patient. Within the training it should be highlighted in clear way the roles of both physiotherapist and patient. The role of physiotherapist is being a "trainer" in physical and mental aspect in a physiotherapy process, particularly when the protocols are based on using equipment and new technologies like exoskeleton, VR etc. The role of physiotherapist and their attitude













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to patient is crucial – patient should be learned that robots or other technical means are only an additional helper in recovery process and will not replace the patient's attitude toward finding the proper movement patterns. Mentally attitude to patient is here important.

- To learn examples and protocols with exercises dedicated to patients at home.
- To learn proper using the exoskeleton and other robotic machines as well as VR technologies including the correct interpretation of data this is fundamental.
- To learn the normal basic gait patterns with all relevant knowledge of anatomical, physiological, and biomechanical processes and prerequisite. To have an understanding of Clinical Reasoning and hypothesis-based work. To measure appropriate assessments and tests to evaluate gait and its components (such as force or angle measurements).
- Knowledge of deviations of the respective gait phases and their possible reasons
  with the help of videos. The material should be authentic, i.e. based on real cases,
  as it makes no sense to watch an imitation of gait.
- To practice the use of gait documentation forms and the content evaluation of them.
- To pay attention to the targeted use of aids e.g. insoles, orthoses and rollators and also to use the interdisciplinary discourse in this regard.
- To be able to use therapeutic aids such as the walking frame in a meaningful way and also other equipment and robot-supported aids such as the exoskeleton, the body wight supported treadmill and other virtual technologies.
- The material should be authentic, i.e. based on medical cases, as it makes no sense to watch an imitation of gait.

To characterize the **current knowledge and background** of health professionals, especially those related with physiotherapy in gait.

- The general knowledge is on good level however the up to date knowledge, new methods or technologies in physiotherapy are mainly not included from practical point of view – if they are incorporated in curricula the topics are provided theoretically.
- The learning materials are not adjusted to the students. Difficult knowledge is hard to understand.

To identify the **knowledge areas required** for the application of new technologies in the gait physiotherapy.

• Regarding new technologies it is crucial to learn and understand of how to interpret and use data generated. The training materials should be user-friendly.

To assess the **interest** in the training topics.

 The educational tool for gait physiotherapy that will be based on proven (fundamental) knowledge and many years of experience and the latest knowledge













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based on new and innovative technologies, presented in a modern way, based on audio-visual methods is very much needed.

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# Annex 1 Focus group guide













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#### **FOCUS GROUP GUIDE**

#### **TECHNIQUE**

FOCUS GROUP AIMED TO GATHER INFORMATION CONCERNING THE TRAINING NEEDS OF EUROPEAN PROFESSIONALS INVOLVED IN THE PHYSIOTHERAPY IN GATE.

#### **PROJECT**

Focus group session is developed in the framework of the European Project SMARTherapy+. The main objective of the project is the development of an innovative comprehensive and homogeneous in European level educational tool available online for teachers and students of medical health higher schools. Particularly the purpose of this educational tool is to provide the possibility to create the high quality gait physiotherapy learning procedures, based on the up-to-date knowledge of physiotherapy and the modern & smart methodologies for effective forms of teaching. Training content will be developed focusing on the main interest areas of the health professionals in Europe, especially those involved in gait physiotherapy.

#### OBJECTIVE OF THE FOCUS GROUP SESSION

The following general objectives of the focus group session have been established:

- To identify the main objectives, procedures and possible structure of SMARTherapy+ tool
- To recognise a personal and institutional target group preferences.
- To recognise the desired **types of case studies** that should be developed within the training materials including possible scenarios of gait physiotherapy protocols.
- To define the **educational needs** in gait physiotherapy around EU countries.
- To characterize the **current knowledge and background** of health professionals, especially those related with physiotherapy in gait.
- To identify the knowledge areas required for the application of new technologies in the gait physiotherapy.













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To assess the interest in the training topics.

#### RECOMMENDED PROFILE OF THE PARTICIPANTS

The participants should represent physiotherapy profession and possess at least 5 year experience in providing physiotherapy health services and/or have been graduated in physiotherapy profession and possess at least 5 year experience in teaching in this area. The recommended number of participants is 4-6.

#### **HUMAN RESOURCES**

- MODERATOR OF THE SESSION: in charge of leading the session, assuring that all planned issues are analyzed and that the objectives are accomplished. The moderator will control time assuring that all members participate in a relaxed environment. Moderator explore deeply the topics initiates experts to share their knowledge. Moderator decides about the sequence of experts giving their answers/opinions about the certain topic.
- OBSERVER: He is providing support to the moderator, recording the meeting course and taking minutes of the meeting. He can ask the moderator about dealing with a specific or remaining issue.
- PARTICIPANTS: The participants must respect the other members of the focus group.

#### **MATERIAL RESOURCES**

- Online conference system (e.g. zoom.us; MS Teams etc.) or meeting room
- Power point, Blackboard, material
- Record card for observations
- Recorder













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#### **GDPR INFORMATION CLAUSE**

 Before recording the session the OBSERVER ask all participants for permission and inform about General Data Protection Regulation GDPR.

#### **GDPR Information Clause:**

The Controller of your personal data is Project Consortium (PC) under the project Erasmus+ titled: "Smart learning for gait physiotherapy – a standardized tool for health higher education in Europe" <a href="https://smartherapyplus.eu/">https://smartherapyplus.eu/</a>, contract number: 2020-1-PL01-KA203-082292, with members of Silesian University of Technology (Poland) as the project coordinator and: Fondazione Politecnico di Milano (Italy), Universitat zu Lubeck (Germany), and the Jerzy Kukuczka Academy of Physical Education in Katowice (Poland) as the project partners.

Any questions or requests related to the processing of personal data by PC should be sent to the following addresses: Joanna.Bartnicka@polsl.pl.

Your personal data shall be processed only for the purposes of dissemination and reporting activities of PC under the project Erasmus+ titled: "Smart learning for gait physiotherapy – a standardized tool for health higher education in Europe" contract number: 2020-1-PL01-KA203-082292 and will not be transferred outside the PC.

#### **DEVELOPMENT OF THE SESSION**

The session will last approximately one hour, and the following structure is recommended:

- 1. Presentation of the SMARTherapy+ project main idea and objectives (3 min.)
- 2. Explanation the aim and the role of focus group session (2 min.)
- Brief presentation by each expert of his/her professional achievements (specialization, professional experience in physiotherapy including gait physiotherapy; place of professional practice; scientific publications etc.).(10 min.)
- 4. Interview and discussion about training needs for gait physiotherapy with the use of interview questionnaire (40 min.)
- 5. Conclusions. (3 min.)
- 6. Farewell and gratitude. (2 min.)













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#### INTERVIEW QUESTIONNAIRE

- 1. Description of the most common gait pathologies in the practice.
- 2. An attempt to characterization of and/or systematization of knowledge about patients who are advised by specialists in gait physiotherapy (are they patients with specific diseases, civilization diseases; are the gait problems caused by improper lifestyle; are they elderly people etc.?)
- 3. Description of the most difficult case or cases in gait physiotherapy and presentation of possible difficulties and barriers in managing such patients. What support do experts use: literature, consultation with other physiotherapists etc.
- 4. Has the issues of gait physiotherapy been expanded with new methods, techniques, tools over the last 10 years? Is the number of patients with gait problems increasing? Are they mostly patients with a condition requiring ad hoc or permanent physiotherapy? What is the direction of gait physiotherapy development?
- 5. What kind of knowledge is not given within education process (studies) and what kind of knowledge needs to be supplemented by additional courses, trainings, literature etc. in order to be able to treat patient at the highest level?
- 6. What issues were only briefly discussed in the education process (studies) or were only discussed theoretically, but from the perspective of the current work experience are considered as important and necessary.
- 7. What is the opinion about online training in gait physiotherapy. What kind of feature the online course should include to be effective and meet the expectation of physiotherapist professionals. Definition of the strengths and weaknesses of online training.













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