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Piano nazionale per gli investimenti complementari al PNRR
Ministero dell'Università e della Ricerca

FIT4MEDROB

D1.2REV

NEEDS OF HEALTHCARE PRACTITIONERS

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CO	Confidential, restricted under conditions set out in Partners Agreement	

HISTORY OF CHANGES

VERSION	SUBMISSION DATE	CHANGES
V1	21/05/2023	
V2	15/05/2024	The deliverable underwent a thorough revision in line with the suggestions provided by the reviewers. The structure was significantly modified to enhance clarity, while the work done has been more rigorously justified in alignment with the scopes of the Initiative.

TABLE OF CONTENTS

Executive Summary

This deliverable reports the work done to prepare and disseminate surveys aimed at collecting opinions and perceived barriers (and thus unmet needs) of the healthcare professionals working in the rehabilitation field.

Rehabilitation professionals in Fit4MedRob can be classified in two broad stakeholders' categories: (i) healthcare professionals who care for the entire patient's rehabilitation pathway and (ii) prosthetists and orthotists. The first category includes physicians, physical therapists, psychologists, speech therapists, nurses, occupational therapists. The second category is involved in the actual construction of prostheses, and in patients' training (mostly amputees).

As the needs of the two healthcare professionals differ, we have implemented two separate surveys. The surveys will be distributed to both consortium members and non-members, by involving scientific societies (see Appendix 1), in order to gain a more comprehensive understanding of the needs of rehabilitation professionals in the context of robotics in Italy.

To develop the survey for the first category of practitioners, we initially sought to identify previous experience in similar initiatives, reported either in the literature or collected among consortium partners from past projects. We found that past surveys focused on specific aspects of rehabilitation or specific diseases, without being exhaustive. Therefore, we designed a novel, comprehensive, as much as possible exhaustive, questionnaire. We then implemented the survey instrument using the web-based tool KoboToolbox.

For the second category of professionals (prosthetists and orthotists), interviews were carried out with the managers of the internal production lines of the INAIL prosthesis center to identify the robotic components more frequently used, whose strengths and weaknesses are to be investigated. A qualitative-quantitative methodological approach was used, so that the survey is made by multiple-choice questions, supplemented by open questions and free comments. The Microsoft Office Forms application was used to implement this survey.

The survey questionnaires are reported as the last part of the deliverable. However, since some logic is implemented to guide the flow of questions depending on the answers provided, also the links to actual online surveys are provided, both in Italian and English.

1 INTRODUCTION

Large-scale use in the clinical routine of sophisticated robots and allied digital technologies has been hindered so far by a number of issues. One of the first objectives of Mission 1 of Fit4MedRob is to carry out a thorough user needs elicitation and analysis, on one side to potentially highlight the need for development of new systems/adaptation of the existing ones during the Initiative, and on the other side to facilitate the carrying out of trials during the Initiative, by minimizing possible issues due to organizational, logistic or usability problems.

Surveys promoted by Mission 1 are addressed to both target patient groups and healthcare operators. The development and dissemination of the surveys addressed to patients are described in deliverable D1.1, while this deliverable reports the methodology used for the development of surveys aimed at collecting the healthcare practitioners' needs. The goal was to identify the barriers, from the practitioners' point of view, that have prevented the wide application of robotic rehabilitation in clinical practice so far. Through an extensive activity, also involving scientific societies, the surveys will be disseminated among practitioners belonging to the consortium and among practitioners outside the Initiative.

More precisely, two surveys were developed. The first survey is dedicated to the practitioners of rehabilitation treatment in general (such as physicians, physical therapists, nurses, psychologists, speech therapists, occupation therapist). The second survey is specific for the prosthetist and orthotist involved in the design, construction and patients' training of the exoskeletal medical devices and prosthetic devices. The reason for the development of two different surveys was that the first healthcare professional category has more general competences in rehabilitation and utilizes a wider range of robotic devices, while the second works on very specific, assistive, devices. Thus, their needs could be very different. The Fit4MedRob consortium has the chance to perform a specific survey for prosthetists and orthotists thanks to the presence of INAIL, as a partner, which is the National Institute for Insurance on Accidents at Work, with a nation-wide experience on amputees' care.

Accordingly, this deliverable is structured in two main sections, illustrating the methodology used to develop each of the two surveys and, eventually, the two survey questionnaires.

For the first survey, we aim at developing a comprehensive, as much as possible exhaustive, instrument. The first step has been the collection of past experiences in the development and dissemination of similar surveys. Past experience has been drawn from:

a) narrative literature review, whose results are illustrated in this deliverable;
b) previous experience of the Consortium partners who already took part in projects delivering surveys with similar objectives, such as the project RehaTech4child (Rehabilitation Technologies For children), which is a cross-sectional study involving an online survey, sponsored by the EACD- European Academy of Childhood Disability

Based on the analysis of past experience and shortcoming of the previous surveys, we have developed a new survey with a set of questions related to various aspects of rehabilitation robotics from the healthcare professionals point of view.

Finally, we have implemented the survey through a web tool (KoboToolbox).

For the second survey, the methodology has been mostly based on interviews carried out with the managers of the internal production lines of the INAIL prosthesis center to identify which robotic components currently still need to be investigated in terms of strengths and weaknesses.

Both surveys include both multiple choice questions and open questions, in such a way that respondents could feel free to express their opinion on some critical issues. For their dissemination, the surveys were shared within various channels, from partners Consortium facilities to scientific societies. The presentation of the surveys to the scientific societies was made during a meeting with all the researchers participating in Mission 1 of the Initiative and the representatives of the scientific societies.

2 THE SURVEY FOR THE HEALTHCARE PRACTITIONERS

2.1 NARRATIVE LITERATURE REVIEW

As aforementioned, we first looked for existing tools for eliciting healthcare operators' needs. In order to cover both peer-reviewed and grey literature (e.g., industry whitepapers or informal surveys), a search was conducted on *Google Scholar* using the following query:

requirements AND robot AND rehabilitation AND (survey OR questionnaire).

PubMed was also used as a search engine, but it provided overlapping or non-relevant additional results.

The query resulted in about 17,000 papers from 2005 to early 2023, that we screened with the help of a tool for semi-automation abstract screening (http://abstrackr.cebm.brown.edu).

Additional inclusion criteria consisted in:

- the paper included a requirements analysis for therapists only or for therapists and patients together;
- the article is not purely a report on the effectiveness of the rehabilitation robot itself, but it reports methods and results for eliciting the operators' opinion.

At the end of the screening process, 12 papers were selected for full-text analysis and further used to inform our research and questionnaire design. A total of 45 requirements of the rehabilitation robotics (see Figure 1) have been identified from the selected articles. After reviewing the requirements, 6 categories were identified:

- Structural (n = 14),
- Software (n = 9),
- Functional (n = 6),
- Safety (n = 8),
- Cost (n = 4),
- Trustability (n = 4).

The following section will expand upon the aforementioned requirements and discuss the key findings of the review, together with their relevance to the Initiative.

2.1.1 Structural requirements

A common theme among the interviews presented in the reviewed articles is the need for a therapeutic robot tailored to the needs of as many patients as possible [1–6] (Unspecificity). This encompasses the consideration of patients' physical characteristics, such as age, weight, disabilities, etc., as well as the specific exercises needed for their therapy (High Degree-Of-Freedom (DOFs) [1–3,5,7,8], High repetition [2–4,9], Usable in a seated [2,3,9] or standing position [3]).

One frequent complaint was about the difficulty of using the robot (User Friendly) [1,2,5,7,8,10], but also the long and complex process of set-up [1–4,10], donning and doffing, and other logistic issues [1,2,4,6,7]. Many therapists felt that they would be unlikely to consider robot therapy if the initial steps required to use it were too time-consuming [2,4]. Other relevant requirements to be considered are comfort [1,2,6], stability [1–3,7,9], and focus (e.g., no distracting sounds) [6] of patients during the robotic session.

With regard to home-based robots, divergent opinions emerged. Some believed that a domicile robot could help with the amount of therapy performed by patients [1], while others argued that an independent use was inadvisable due to high chance of incorrect use, overuse and over-reliance [1].

Nonetheless, semi-supervised use was generally seen as positive [1,3,4,10], with some suggesting the possibility of group therapy [4].

2.1.2 Functional requirements

It is imperative that a direct correlation is established between the therapeutic robot and the Activities of Daily Living [2–4,9–11] such as grooming, personal hygiene, feeding oneself. This correlation is essential for the delivery of goal-oriented therapy [2] tailored to the specific needs of each patient.

2.1.3 Software requirements

Patient monitoring is seen as a critical need by therapists [2,6,8]. In order to do so it is mandatory to gather patient-specific data [1,2,4,8] on therapy sessions and configurations for donning. These data must not be modified, therefore data access authority is required [1,8]. Software modules providing motivation and gamification [1-3] are also quite important [1,4,7,10], and many believe that robots can help by providing feedback to patients (and therapists alike) [1,2,4,8,10], even though some operators are against using that feature [1] and making the exterior of the robot attractive, because of risk of the patient becoming distracted [12]. Another important requirement is being compatible with other software, such as notes, billing/insurance [8], the electronic patient record, etc.

2.1.4 Safety requirements

It is clear that adherence to safety regulations is of paramount importance. The main concerns for safety requirements were about misuse of the device, in the absence of supervision by medical professionals. In order to enhance the safety of the device a set of features has to be implemented , such as a kill switch [1,8], alarm systems with sounds and messages [1,8], a mechanism that returns the device to a safe position whenever an error occurs [8]. Mechanical safety should be guaranteed [1,6] (no finger traps etc.) at all times.

2.1.5 Cost requirements

Many complained that the devices were too expensive [2], not cost-effective [10], and often weren't even eligible for refund by the public healthcare system [1].

Some papers also investigated how much money the therapist/institutions were willing to spend [1,3,9] to acquire or use the device, but the prices were heavily dependent on the country where the study was conducted and the economic situation at the specific times of the survey/interviews.

2.1.6 Other requirements

Providing adequate Assistance [1,2] and Training [10] should be taken into consideration when developing a robotic device. Some patients weren't too sure how to feel about the robotic device since they were afraid it might look too technical [6]. It is therefore important that healthcare operators ensure that their patients do not feel intimidated by the robot [5]. Findings suggest that if the use is recommended by the therapists theirselves, this could foster patient acceptance and feelings towards the device [10].

2.1.7 Main findings from past experience

The findings in the previous paragraphs show that many times, these technologies are designed without sufficient attention to usability, making them difficult for healthcare practitioners to use them effectively. This can be a major barrier to their adoption and utilization in healthcare settings.

Human-centered design principles should be employed to ensure that these technologies are intuitive, user-friendly, and aligned with the specific needs of healthcare practitioners.

Furthermore, the majority of hospitals often lack up-to-date and efficient information technology systems. Outdated systems can pose challenges when it comes to integrating emerging technologies, such as rehabilitation robots, with the existing infrastructure. One specific challenge is integrating the outcomes of robot-assisted treatments with the patient's Health Care Record (HCR). This integration is crucial for ensuring comprehensive and accurate documentation of the patient's healthcare journey. The lack of integration between emerging technologies and HCRs can be a significant deterrent for healthcare practitioners in adopting and utilizing robotics and allied digital technologies.

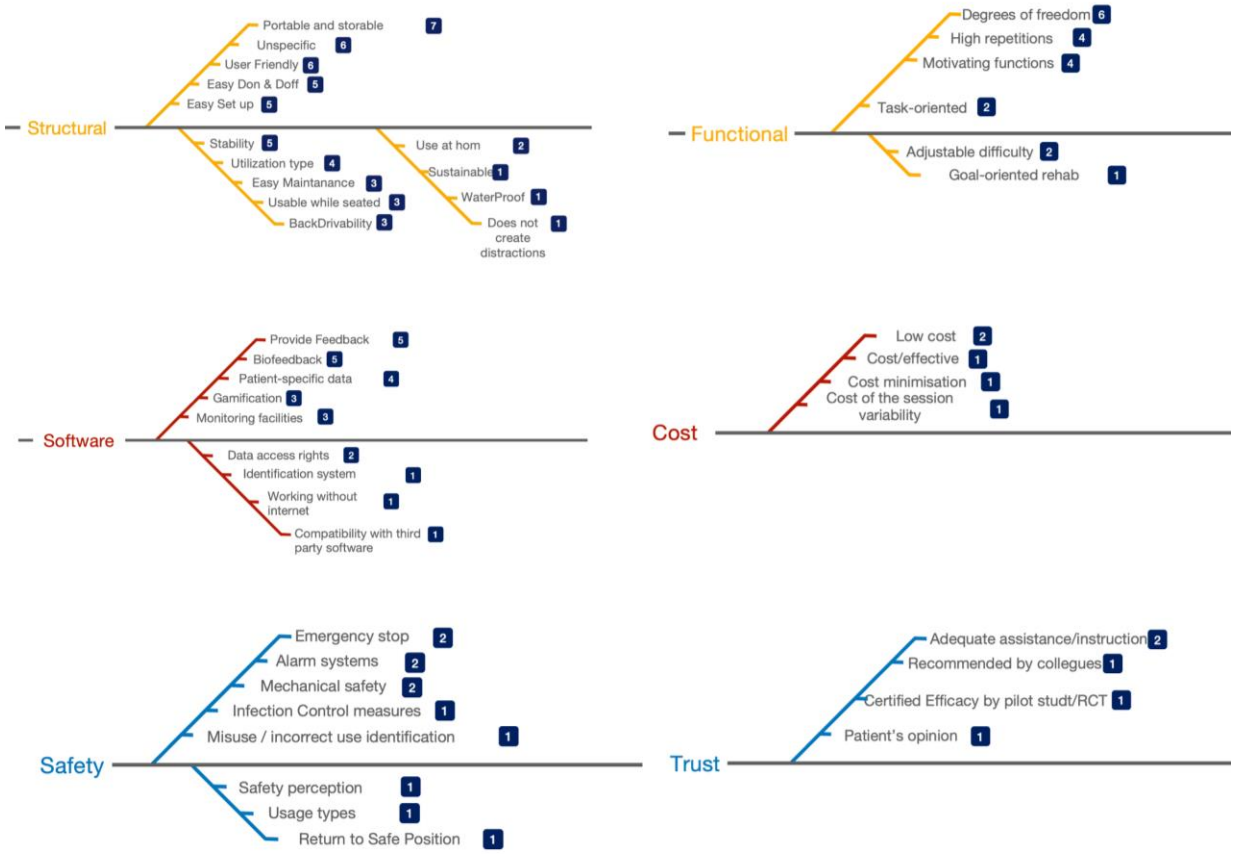


Fig. 1 A visualization of the user needs and requirements identified in the literature review, organized into 6 macro categories. The figure reports (in the blue squares) the number of articles in our review mentioning/supporting the specific requirement.

Moreover, healthcare practitioners should be provided with adequate training and support to effectively use and integrate robotics and allied digital technologies into their practice. Training programs should not only focus on the technical aspects of operating these technologies but also emphasize their integration into the existing healthcare processes and workflows.

By addressing usability concerns, improving information and communication technology (ICT) systems, and providing comprehensive training, healthcare institutions can help bridge the gap between emerging technologies and healthcare practitioners. This, in turn, would facilitate the wider adoption and utilization of robotics and digital technologies, leading to enhanced patient care, improved outcomes, and increased efficiency in healthcare delivery.

Additional specific requirements highlighted in the selected papers were: (a) fit the needs of as many people as possible while keeping rehabilitation robot devices user-friendly; (b) devices should be lightweight and easily transportable and storable, especially if home-based use is considered; (c) It is also key to make the robot engaging and motivating for the patients; (d) devices able to perform a wider range of well-implemented exercises, instead of a single one, seem preferable.

In addition to highlight a number of issues, the literature shows some discrepancies between operators' opinions, also due to different organizations and economical assets in the different countries.

Therefore, it is very important to study operators' opinions in Italian institutions (and still there could be differences in the different Regions, which could be interesting to analyze).

An additional issue concerning previous surveys, both from the literature and from the previous experience of Consortium partners (“Motor REHAbilitation TEChnologies for CHIldren With Disability” [13]) is that surveys were

specific for diseases (in particular, stroke [1, 2, 3, 5, 6, 7]) and/or for the motor domain ([2, 3, 4, 5, 7, 8, 9, 10, 11, 12]). Therefore, we aim at developing a comprehensive survey:

- That can be disseminated within a high number of healthcare professionals in Italy to depict the national landscape.
- general enough so that it can address all the pathologies of interest within the Initiative
- that is not specific to a particular robot but allows operators to give their opinions based on the robots familiar to them, across different domains (motor, cognitive and assistive).

Our literature study has been used, together with the experience of the working group, to inform an Initiative-specific instrument development, i.e., the tool for implementing the survey described in the next section. As a matter of fact, the final version of the surveys has been the results of a series of iterations where the different items were deeply discussed within the working group and also relying on the feedback of the scientific societies after the survey presentation in September 2023.

The survey will be disseminated within the consortium and also externally through the help of scientific societies, to gather the largest sample of Italian respondents to date. As already mentioned, results of such a study will be pivotal to inform the following key phases of the Initiative. In particular, the analysis of surveys results will be useful fo a better organization of the clinical trials planned within Fit4MedRob.

2.2 THE SURVEY QUESTIONNAIRE OVERVIEW

As will be discussed in greater detail in the subsequent section, we have developed our survey instrument using a web-based questionnaire solution, inspired both by the findings of the above described literature analysis and by comparable (albeit more narrow-scoped) studies like EACD (European Academy of Childhood Disability) RehaTech4Child Survey [13] [14].

The instrument for user needs identification investigates key constructs identified in the aforementioned review, through:

- Questions about demographics and background. Note that in addition to therapists, other individuals with different technical role (e.g., bioengineers) could be part of our respondents.
- Questions about familiarity with technology: “Did you already use robotic devices for therapy purposes?”

If the answer is yes, questions about their experiences and opinions with robotic devices will follow. In particular, for each device type listed in the functional classification, a set of questions extrapolated from the present literature mapping study will be asked.

Although the primary subjects of the Initiative are patients with specific illnesses, such as central or peripheral nervous system injuries and disorders, those at risk of occupational diseases and the frail elderly are also included. Furthermore, the effects that robot therapy has on pediatric patients are of special interest. Therefore, questions about what kind of patients the therapists treated, what the objectives of robotic rehabilitation were, and whether they were actually met, will be crucial.

Eventually, also validated instruments as SUS (System Usability Scale, a well-known validated instrument) will be administered.

If the therapist had no experience with robotic technology, the survey will expand on their knowledge and beliefs on robotic devices and if they wish to use them.

2.2.1 The questionnaire sections

Given the diversity of healthcare practitioners, whose roles may vary within the rehabilitation process, the survey will be mainly focused on collecting their backgrounds, experiences and opinions about the technological devices. We started from the already existing technological devices currently available on the market (as outlined in the census described in Deliverable D1.1). Since the total amount of devices was extremely high, we categorize them into 10 classes based on their common features:

- Advanced treadmill;

- Assistive (generic);
- Assistive UL;
- Assistive LL;
- LL End Effector;
- LL Exoskeleton;
- UL End Effector;
- UL Exoskeleton;
- Proprioceptive/stabilometric/balance platform;
- Sensor-Based/VR/cognitive.

KoboToolbox (https://www.kobotoolbox.org/) was employed for the implementation of the survey. This instrument was selected due to its possibility to create a survey with an architecture that allows for the selection of numerous options and a large number of question items (indeed, Microsoft Office Forms, used for the patients' survey, has severe limitations for complex surveys, e.g., it allows no more than 200 questions).

The survey begins with an introduction that explores the clinician's background, such as years of experience in the rehabilitative field, confidence in the rehabilitative field and in the use of technologies. Then, for each device class, a series of 5-point Likert scale questions are asked to elicit attitudes and appreciation for employing devices, as well as perceived potential barriers to the introduction of technologies in the clinical practice.

At the end of the questions about a device class, the respondent is asked to fill in a System Usability Scale (SUS) for one of the devices belonging to the aforementioned class. At the end of the presentation of all device classes, there is the possibility to fill in one “extra” SUS for another device (e.g., a device the operator is particularly experienced with).

Eventually, a free text field is provided for respondents to provide any additional comments about any of the aspects considered by the review.

Figure 2 shows the beginning of the survey, while figure 3 shows a set of questions for evaluating a specific device.

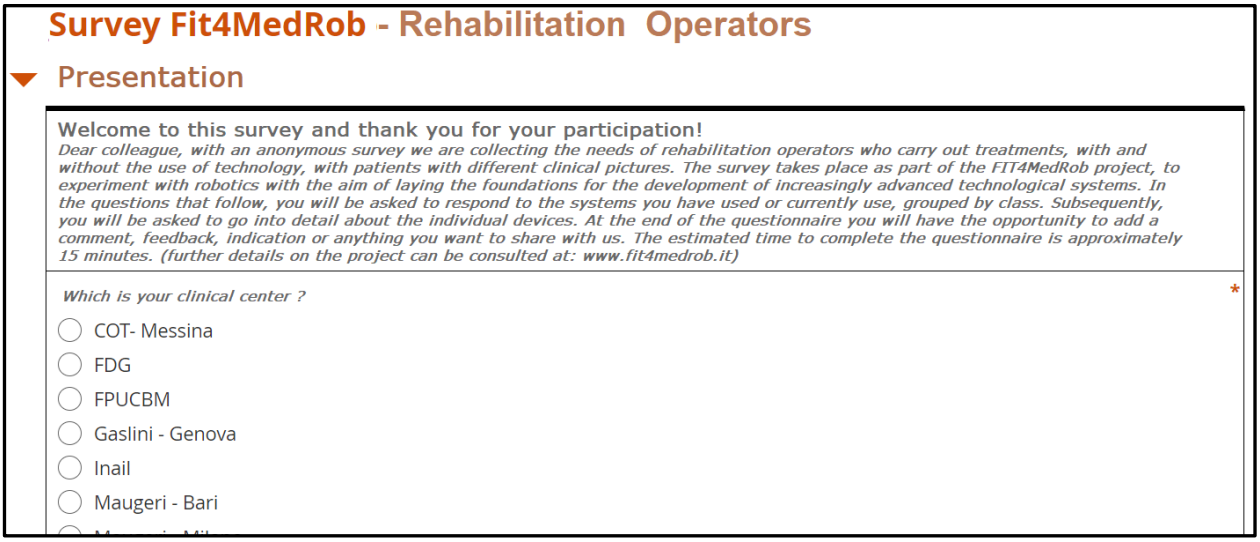
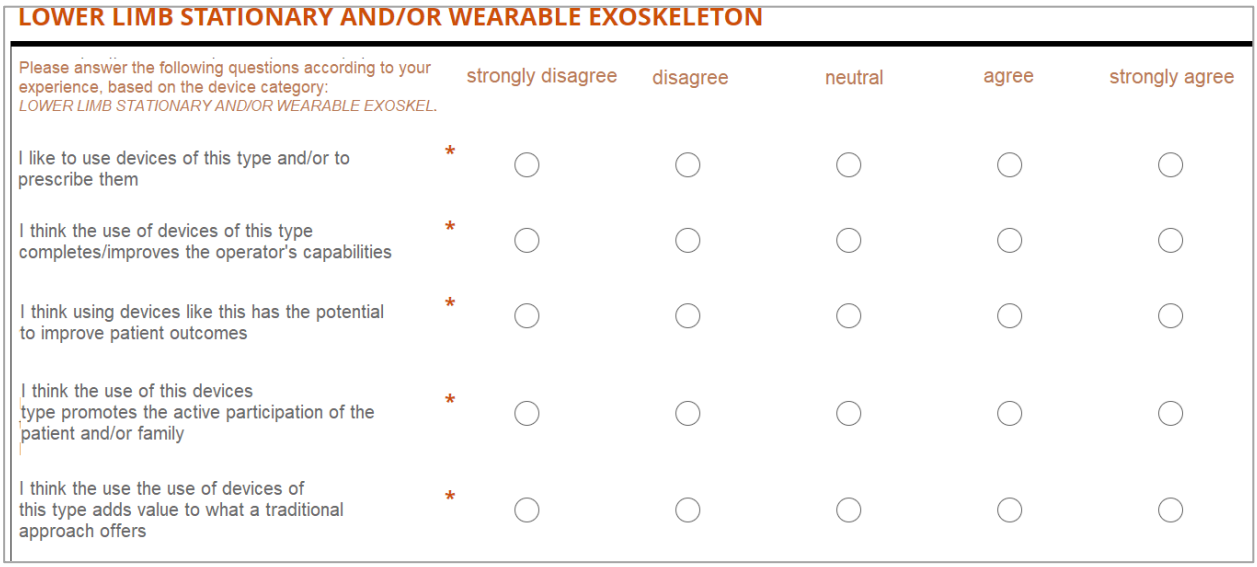


Fig. 2 The initial page of the survey for the rehabilitation healthcare operators



LOWER LIMB STATIONARY AND/OR WEARABLE EXOSKELETON

Please answer the following questions according to your experience, based on the device category: *LOWER LIMB STATIONARY AND/OR WEARABLE EXOSKEL.*		strongly disagree	disagree	neutral	agree	strongly agree
I like to use devices of this type and/or to prescribe them	*	○	○	○	○	○
I think the use of devices of this type completes/improves the operator's capabilities	*	○	○	○	○	○
I think using devices like this has the potential to improve patient outcomes	*	○	○	○	○	○
I think the use of this devices type promotes the active participation of the patient and/or family	*	○	○	○	○	○
I think the use the use of devices of this type adds value to what a traditional approach offers	*	○	○	○	○	○

Fig. 3 A scratch of the set of questions for evaluating a specific device, in this case an exoskeleton.

The final version of the questionnaire can be viewed at the following links: https://ee.kobotoolbox.org/preview/I9U2jdvu (Italian version)

https://ee.kobotoolbox.org/preview/H2o5e3NI (English version, not intended to be distributed).

3 THE SURVEY ON THE USER'S NEEDS OF PROSTHETIST AND ORTHOTIST

Pursuant to Law 251/2000, the Certified Prosthetist and Orthotist (CPO) is the " health professional who, on the basis of a medical diagnosis and in compliance with a rehabilitation and therapeutic program, with independent and direct technical/clinical assessment of the patient, plans, implements, adapts, applies and operates the supply and commissioning of exoskeletal medical devices.". And again "the certified prosthetists and orthotists, within his/her skills, trains the disabled person in the use of prostheses and applied orthoses. In collaboration with the doctor, it carries out technical assistance for the supply, replacement and repair of the applied prostheses and orthoses and collaborates with other professionals in the multidisciplinary treatment expected by the rehabilitation plan" (art. 1 of the decree of the Ministry of Health, no. 665, of 14 September 1994).

According to this definition, the CPO, unlike other healthcare professionals, is responsible for the actual construction of CMD medical devices (Custom Made Device, according to MDR 745/2017), including those resulting from the assembly of standard robotic technologies with custom-built parts. About that, it should be noted that many of the devices built by the CPO are also wearable devices designed for personal daily use (i.e., external limb prostheses). Therefore, the interaction with rehabilitation robotic technology of CPOs is different from that of the other healthcare professionals, since for CPOs the prosthetic robotic components are tools for the creation of new medical devices deriving from their assembly. In fact, they do not simply use the robotic devices with patients for rehabilitation purposes but exploit robotic technologies to create new prostheses with the more suitable and specific functionalities and characteristics for each amputee.

About the CPOs employed in the construction of external limb prostheses, due to their particular profession and use of robotic technologies, within the Fit4MedRob Initiative it is considered necessary to carry out a specific listening action, defining a specific survey different from that for other healthcare professionals and more suitable for their role towards amputees, a patient population for which they are the reference healthcare figure and the main

interlocutor. The objective of this specific survey is to assess the critical issues associated with prosthetic robotics inventions currently applied and translated into assistive devices, and how these can be improved. This will lead to a reflection on their impact in relation to the technical training necessary for their implementation service, an understanding of the implications on production processes, and an evaluation on their cost in relation to the functional benefits they provide. We believe that the data obtained from this investigation will be very useful within the Initiative, to address the development of more optimal and performing robotic technologies to be used in the creation of innovative prostheses able to more effectively satisfy the actual needs of amputee, increasing their usability and embodiment. To achieve this goal, according to the aim of the Initiative, the summary information obtained from this data analysis will be shared with the partners who specifically deal with the development of these technologies (IIT, SSSA, UCBM, etc.), often in synergy with manufacturing companies in the sector (Ottobock, Ossur, etc.).

3.1 OBJECTIVE

This survey arises from the need to include in the development of new technological solutions for amputee patients, the opinion of CPOs who apply prosthetic components with robotic technology.

The objective of this study is to understand, by listening to the expert CPOs registered in FNO TSRM and PSTRP (Federazione nazionale Ordini dei tecnici sanitari di radiologia medica, delle professioni sanitarie tecniche, della riabilitazione e della prevenzione) registers, and in particular those who work in the INAIL Prosthesis Center, what their needs are regarding the creation of functional and technologically advanced prostheses that meet the needs of the patients, and to evaluate how the robotic components currently used can provide valid answers to these needs. For this purpose, possible critical issues in the application and functioning of the robotic components currently used at the Prosthesis Center will be investigated, and the technicians' indications and suggestions on the aspects that, according to their experience, need improvement will be collected.

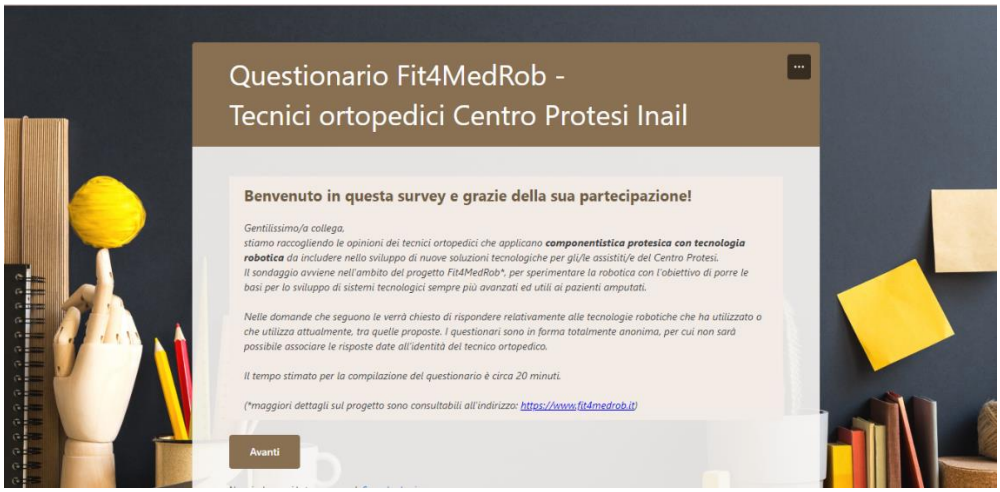


Figure 4- Introduction page of the questionnaire with welcome message and introduction to the survey.

3.2 METHODS

Interviews were conducted with the managers of the internal production lines of the Prosthesis Center (upper limb, transtibial lower limb, and transfemoral lower limb) in order to identify the robotic components (brand and model) most frequently used today in the production of prostheses, to investigate their strengths and weaknesses. Based on the type of information to be collected, it was decided to use a qualitative-quantitative methodological approach. The survey is composed of a structured part, with multiple choice questions, supplemented by a series of open questions or spaces for comments where the respondent is given the opportunity to formulate or complete an

answer. Qualitative contributions make it possible to gather information that cannot be structured in a pre-established analytical model of questioning and that contributes to better understanding of the reality being studied.

The Microsoft Office Forms application was used to implement the survey. The questionnaire consists of a general introduction part where information about the respondents is collected.

Figure 5 - General introduction part.

In particular, the main items investigated in this first part are:

- social-demographic aspects: demographic and social characteristics of the interviewees;
- aspects related to the professional experience of the technician: in particular, the years of experience in the use of robotic components.

In the second part of the survey, for each prosthetic component with which the interviewee claims to have experience, the following information is collected:

- average age of the patients on whom the component under investigation is mostly applied;
- frequency of use of this component in the creation of prostheses: number of patients per month;
- questions regarding the functionality and performance of the component both in terms of effectiveness in the final use of the prosthesis by the patient, and in terms of ease of assembly and/or setting in the prosthesis manufacturing phase. In this second part of the survey, open questions were also included, in which the technician is asked to express his opinion on the characteristics of the robotic component being investigated and/or to provide improvement proposals related to any critical issues identified.

Figure 6 - Sample screen of the second part of the questionnaire with specific questions for each robotic component in use at the Centre.

The final version of the questionnaire can be visited at the following link, where both Italian and English versions can be accessed:

https://forms.office.com/Pages/ResponsePage.aspx?id=0yKDQQFUb0SZlp4uA-46Xlk5BRGp7KxKirPWugkdyc9UME5DTE1aSUpIUzMwOU8yM04yUUlVOEdZOC4u

LIST OF ABBREVIATIONS

CPO	Certified Prosthetist and Orthotist
EACD	European Academy of Childhood Disability
FNO TSRM and PSTRP	Federazione nazionale Ordini dei tecnici sanitari di radiologia medica, delle professioni sanitarie tecniche, della riabilitazione e della prevenzione
INAIL	Istituto Nazionale Assicurazione Infortuni sul Lavoro
SUS	System Usability Scale

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4 APPENDIX 1

List of scientific societies involved in the development and dissemination of the surveys:

- International Society of Physical and Rehabilitation Medicine (ISPRM)
- Italian Association of Occupational Therapists (AITO)
- Italian Association of Physiotherapy (AIFI)
- Italian Association of Physiotherapy-Network of Specialty Interest (AIFI-NIS)
- Italian Association of Therapists of Neuropsychomotricity of the Developmental Age (AITNE)
- Italian Infantile Cerebral Palsy Group (GIPCI)
- Italian Society of Clinical Neurophysiology (SINC)
- Italian Society of Movement Analysis in Clinic (SIAMOC)
- Italian Society of Neurological Rehabilitation (SIRN)
- Italian Society of Neurology (SIN)
- Italian Society of Physical Medicine and Rehabilitation (SIMFER)
- National Bioengineering Group Association (GNB)
- National Institute for Robotics and Intelligent Machines (I-RIM)
- Specialty Schools of Child Neuropsychiatry (SINPIA)

5 APPENDIX 2

In this section we report:

- The actual questionnaire for the practitioners of robotic rehabilitation

- The actual questionnaire for the certified prosthetist and orthotist

As already mentioned, note that questionnaires include some logic, thus to appreciate the actual flow of questions according to previous answers, the links to the online surveys reported above in this document should be used.

Survey_therapists_Fit4MedRob_ENG

General introductory part

Welcome to this survey and thank you for your participation!

Dear Colleague, We are collecting with an anonymous survey the needs of rehabilitation workers who perform treatments, with and without the use of technology, with patients with different clinical pictures. The survey is taking place as part of the FIT4MedRob project to experiment with robotics with the aim of laying the foundation for the development of increasingly advanced technological systems. In the following questions, you will be asked to respond relative to the systems you have used or are currently using grouped by class. Next, you will be asked to go into detail about individual devices. At the end of the questionnaire you will have the opportunity to add a comment, feedback, guidance or anything you feel like sharing with us. The estimated time for filling out the questionnaire is about 15 minutes. (*More details about the project can be found at: www.fit4medrob.it)*

In which clinical center do you practice? *

- ○ COT- Messina
- ○ FDG
- ○ FPUCBM
- ○ Gaslini - Genoa
- ○ Inail
- ○ Maugeri - Bari
- ○ Maugeri - Milan
- ○ Maugeri - Montescano
- ○ Maugeri - Pavia
- ○ Medea - Lecco
- ○ Mondino - Pavia
- ○ San Martino - Genoa
- ○ Stella Maris - Pisa
- ○ UniMoRe - Modena Reggio E.
- ○ UniNa - Naples
- ○ UNIPI - Pisa
- ○ Other center

Could you indicate your gender? *

- Male
- Female
- I prefer not to declare it

In what range does your age fall? *

- 21-30 years old
- 31-40 years old
- 41-50 years old
- 51-60 years old
- >60 years old

How many years of experience do you have in the rehabilitation field? *

- Less than 1 year
- 2 to 5 years old
- 6 to 10 years old
- 11 to 20 years old
- Over 20 years

How many years of experience do you have in using technology for rehabilitation and particularly in robotic rehabilitation? *

- I have no experience
- Less than 1 year
- 2 to 5 years old
- 6 to 10 years old
- 11 to 20 years old
- Over 20 years

What is your profession? *

- Physician
- Physiotherapist
- Developmental neuro and psychomotricity therapist
- Occupational therapist
- Orthopedic technician
- Nurse
- OSS
- Psychologist
- Educator

- more

Where do you mainly do your work? *

- [ ] Acute care unit
- [ ] Post-acute inpatient rehabilitation (codes 56, 28, 75)
- [ ] Residential post-acute rehabilitation (territorial)
- [ ] Outpatient rehabilitation
- [ ] Home rehabilitation
- [ ] School or other institutions
- [ ] Research Laboratories
- [ ] More

What is the age range of your patients? *

- [ ] 0-5 years old
- [ ] 6-13 years old
- [ ] 14-18 years old
- [ ] 19-35 years old
- [ ] 36-55 years old
- [ ] 56-75 years old
- [ ] >75 years old

What clinical pictures do you interface with most? *

- [ ] Infantile Cerebral Palsy
- [ ] Stroke
- [ ] Multiple sclerosis
- [ ] Acquired cerebral lesions
- [ ] Myel lesions
- [ ] Outcomes of cancer surgery
- [ ] Parkinson's
- [ ] SLA
- [ ] Amputations
- [ ] Neuropathies
- [ ] Dystrophies
- [ ] Dementias
- [ ] More

Do you use or have you used devices in the following category: ASSISTIVE (GENERIC) AND MOBILE SERVANT? *

Represent some examples of this class of devices eye tracking communicator, The Grid 3, Pepper

- ◯ Yes
- ◯ I don't know them

ASSISTIVE (GENERIC) AND MOBILE SERVANT

Answer the following questions according to your experience/opinion by device category: *ASSISTIVE (GENERIC) AND MOBILE SERVANT*		Strongly disagree	In disagreement	I don't know.	Agreed	Strongly agree
I like to use such devices and/or prescribe them	*	◯	◯	◯	◯	◯
I think the use of such devices complements/improves the capabilities of the operator	*	◯	◯	◯	◯	◯
I think the use of such devices has the potential to improve patient outcomes	*	◯	◯	◯	◯	◯
I think that the use of devices of this type promotes the active participation of the patient and/or family members	*	◯	◯	◯	◯	◯
I think that the use the use of devices of of this type adds value to what a traditional approach offers	*	◯	◯	◯	◯	◯
I think the use of devices of this type is appropriate within my clinical practice	*	◯	◯	◯	◯	◯
People whose opinions/indications/suggestions I value opinion/indications/suggestions think I should use devices of this type	*	◯	◯	◯	◯	◯
My supervisors think I should use devices of this type	*	◯	◯	◯	◯	◯

Answer the following questions according to your experience in order to describe what the BARRIERS	Strongly disagree	In disagreement	I don't know.	Agreed	Strongly agree

ASSISTIVE (GENERIC) AND MOBILE SERVANT

Lack of confidence in such devices *	○		○	○		○
Poor availability or lack of knowledge of scientific literature on such devices *	○	○	○	○	○	
Poor availability of opportunities or low participation in practical training *	○	○	○	○	○	
Lack of time to prepare (set up, clean, calibrate) and rearrange at the end of use *	○	○	○	○	○	
Lack of robustness (in situations such as use intensive, excessive salivation that can damage the device) *	○	○	○	○	○	
Space-related issues (insufficient or inadequate) *	○	○	○	○	○	
Lack of financial resources *	○	○	○	○	○	
Lack of motivation of patients and/or caregivers to participate *	○	○	○	○	○	

We are now asking you to fill out a short questionnaire on ONE device of those in the ASSISTIVE (GENERIC) AND MOBILE SERVANT category.
Please select the one for which you want to proceed with the specific assessment:

- ○ Eye tracking communicator
- ◯ The Grid 3
- ○ Pepper
- ○ more

For treatments with the device in question, would you tell us the outcome measures you use?

barthel

barthel

Do you use the device you indicated following a protocol?

- ◯ Yes, always
- ○ No, never

If yes, would you indicate which one?

int. protocol

int. protocol

Do you use the device you indicated in an integrated treatment?

- ◯ Yes, always
- ◯ Yes, sometimes
- ◯ No, never

SUS (System Usability Scale) on the device selected in the previous question for the ASSISTIVE*(GENERIC)* AND *MOBILE* SERVANT category. *Express how much you agree with the following information:*		Strongly disagree	In disagreement	I don't know.	Agreed	Strongly agree
There is a need to learn many things to be able to use the device	*	◯	◯	◯	◯	◯
To use the device I need assistance	*	◯	◯	◯	◯	◯
People can learn to use the device very quickly	*	◯	◯	◯	◯	◯
I feel safe using the device	*	◯	◯	◯	◯	◯
I found the device unnecessarily complex	*	◯	◯	◯	◯	◯
The device is cumbersome to use	*	◯	◯	◯	◯	◯
I believe that there are inconsistencies in the device	*	◯	◯	◯	◯	◯
The various functions of the device are well integrated	*	◯	◯	◯	◯	◯
I would like to use this device frequently	*	◯	◯	◯	◯	◯
The device is easy to use	*	◯	◯	◯	◯	◯

Do you use/have you used devices of the ADVANCED TREADMILL class? *

Representing some examples of this class of devices are C-mill, GRAIL, Walker view

- ◯ I know them, but I haven't used them
- ◯ I don't know them

Do you use/have you used devices of the UPPER LIMB EXOSKELETON class? *

Examples of this class of devices represent ALEx RS, Armeo Spring, Armeo (R) Spring pediatric, Gloreha Sinfonia, WREX

- ◯ Yes
- ◯ I know them, but I haven't used them
- ◯ I don't know them

Do you use/have you used devices of the LOWER LIMB END EFFECTOR class? *

Examples of this class of devices represent Erigo, Geo, Lambda, and Lexo

- ◯ Yes
- ◯ I know them, but I haven't used them
- ◯ I don't know them

Do you use/have you used devices of the LOWER LIMB EXOSKELETON class? *

Examples of this class of devices represent Ekso, Keoogo, Lokomat, Lokomat Pro, Myosuit, Uango

- ◯ Yes
- ◯ I know them, but I haven't used them
- ◯ I don't know them

Do you use/have you used devices of the ASSISTIVE UPPER LIMB OR UPPER LIMB END EFFECTOR class? *

Representing some examples of this class of devices are Armon, Jaco or Amadeo, BioXtreme, Diego, Icons, InMotion wrist, MOTOR

- ◯ Yes
- ◯ I know them, but I haven't used them
- ◯ I don't know them

Do you use/have you used devices of the PROPRIOCEPTIVE/STABILOMETRIC/BALANCE PLATFORM class? *

Examples of this class of devices represent Dividat Senso, Dividat Senso Flex, GEAMASTER, Hunova, Prokin

- ◯ Yes
- ◯ I know them, but I haven't used them
- ◯ I don't know them

Do you use/have you used devices of the SENSOR BASED/VR/COGNITIVE class? *

Examples of this class of devices represent AV DESK, CareLab (Vitamin), D-wall, hand-arm-leg tutors, HomeKit, Homing, KARI, Myro, NIRVANA, Oculus Quest 2, Pablo, Riablo, Ultra+, VRRS EVO, VRRS Home full set/tablet, VRRS TELECOCKPIT, VRRS TR, YouGrabber

- ◯ Yes
- ◯ I know them, but I haven't used them
- ◯ I don't know them

Is there another device for which you would like to compile the SUS?

It could be either another device in a category for which he chose another, or one that does not fall into the categories mentioned

- ◯ Yes

Is there any additional comment, feedback or direction you would like to share with us?

Please write your comment below. Alternatively, leave blank

We ask you to confirm your willingness to send your answers, anonymously, to the fit4medrob staff *

THANK YOU FOR YOUR CONTRIBUTION! The staff of the Fit4MedRob project

- ◯ OK

✔ Validate

Lingua: English (United Kingdom)

Fit4MedRob Survey - Certified Prosthetists and Orthotists (CPOs)

* Obbligatoria

Welcome to this survey and thank you for your participation!

Dear colleague,
we are collecting the opinions of Certified Prosthetists and Orthostists (CPOs) who use prosthetic components with robotic technology to be included in the development of new technological solutions for amputee patients. The survey takes place as part of the Fit4MedRob project, to experiment with robotics with the aim of laying the foundations for the development of increasingly advanced technological systems useful to amputee patients.*

In the following questions you will be asked to respond about the robotic technologies you have used or currently use, among those proposed. The questionnaires are completely anonymous, so it will not be possible to associate the answers given with the identity of the CPO.

*The estimated time of the questionnaire completion is approximately 20 minutes. (*further details on the project can be found at: https://www.fit4medrob.it)*

General Introduction Part

1. What range does your age fall within? *

- ◯ 18-40 years
- ◯ 41-60 years
- ◯ > 60 years

2. Could you tell us your gender, please? *

- ◯ Male
- ◯ Female
- ◯ Prefer not to say

3. How many years of experience in the prosthetic field have you got? *

- ◯ less than 1 year
- ◯ from 2 to 10 years
- ◯ from 11 to 20 years
- ◯ over 20 years

Robotic Technology
Poly-articulated Hand
MICHELANGELO - OTTOBOCK

4. Have you got experience with this robotic prosthetic component? *

- ◯ Yes
- ◯ No

Robotic Technology
Poly-articulated Hand
TASKA - TASKA PROSTHETICS

5. Have you got experience with this robotic prosthetic component? *

- ◯ Yes
- ◯ No

Robotic Technology
Electronic Elbow
HOSMER E400

6. Have you got experience with this robotic prosthetic component? *

- ◯ Yes
- ◯ No

Robotic Technology

Electronic Elbow

DYNAMIC ARM/TMR DYNAMIC ARM - OTTOBOCK

7. Have you got experience with this robotic prosthetic component? *

- ◯ Yes
- ◯ No

Robotic Technology
Electronic Knee
C-LEG 4 - OTTOBOCK

8. Have you got experience with this robotic prosthetic component? *

- ◯ Yes
- ◯ No

Robotic Technology
Electronic Knee
RHEO XC - OSSUR

9. Have you got experience with this robotic prosthetic component? *

- ◯ Yes
- ◯ No

Robotic Technology
Electronic Knee
GENIUM/GENIUM X3 - OTTOBOCK

10. Have you got experience with this robotic prosthetic component? *

- ◯ Yes
- ◯ No

Robotic Technology
Active Knee
POWER KNEE - OSSUR

11. Have you got experience with this robotic prosthetic component? *

- ◯ Yes
- ◯ No

Robotic Technology
Electronic Ankle
PROPRIO FOOT - OSSUR

12. Have you got experience with this robotic prosthetic component? *

- ◯ Yes
- ◯ No

Robotic Technology
Electronic Ankle
BLATCHFORD - ELAN

13. Have you got experience with this robotic prosthetic component? *

- ◯ Yes
- ◯ No

SURVEY- Poly-articulated Hand MICHELANGELO

Please, answer the questions below reporting your experience with the prosthetic component at issue.

14. What age group do your patients fall into? *

- ◯ 18-42 years
- ◯ 43-65 years
- ◯ >65 years

15. How frequently do you use this robotic technology with your patients? (number of patients per year) *

- ◯ < 5 patients
- ◯ 5 to 10 patients
- ◯ > 10 patients

16. Do you find this robotic technology unnecessarily complicated and difficult to be used? *

- ◯ Yes
- ◯ No

17. Why? *

18. Do you think that the different functions of this robotic technology are well integrated and intuitive? *

- ◯ Yes
- ◯ No

19. Why? *

20. Did you find easy to explain to the patient how to use this robotic technology? *

- ◯ Yes
- ◯ No

21. Why? *

22. Do you think that setting up this robotic technology component takes too long (alignment, fitting,...)? *

- ◯ Yes
- ◯ No

23. Please, indicate the most critical aspects. *

24. Did you need a long time to learn how to assemble the prostheses with this robotic technology component? *

- ◯ Yes
- ◯ No

25. What difficulties did you find during your training period? *

26. Do you think that the use of this component with robotic technology provides added value to traditional components? *

- ◯ Yes
- ◯ No

27. Why? *

28. Regarding the orthopedic technique, do you think there are aspects of usability of this robotic technology that need to be improved (e.g. adjustment interfaces, assembly, reliability, weight, noise, ...)? *

- ◯ Yes
- ◯ No

29. Please, indicate which ones. *

SURVEY- Poly-articulated Hand TASKA

Please, answer the questions below reporting your experience with the prosthetic component at issue.

30. What age group do your patients fall into? *

- ◯ 18-42 years
- ◯ 43-65 years
- ◯ >65 years

31. How frequently do you use this robotic technology with your patients? (number of patients per year) *

- ◯ < 5 patients
- ◯ 5 to 10 patients
- ◯ < 10 patients

32. Do you find this robotic technology unnecessarily complicated and difficult to be used? *

- ◯ Yes
- ◯ No

33. Why? *

34. Do you think that the different functions of this robotic technology are well integrated and intuitive? *

- ◯ Yes
- ◯ No

35. Why? *

36. Did you find easy to explain to the patient how to use this robotic technology? *

- ◯ Yes
- ◯ No

37. Why? *

38. Do you think that setting up this robotic technology component takes too long (alignment, fitting,...)? *

- ◯ Yes
- ◯ No

39. Please, indicate the most critical aspects. *

40. Did you need a long time to learn how to assemble the prostheses with this robotic technology component? *

- ◯ Yes
- ◯ No

41. What difficulties did you find during your training period? *

42. Do you think that the use of this component with robotic technology provides added value to traditional components? *

- ◯ Yes
- ◯ No

43. Why? *

44. Regarding the orthopedic technique, do you think there are aspects of usability of this robotic technology that need to be improved (e.g. adjustment interfaces, assembly, reliability, weight, noise, ...)? *

- ◯ Yes
- ◯ No

45. Please, indicate which ones. *

SURVEY - Electronic Elbow HOSMER

Please, answer the questions below reporting your experience with the prosthetic component at issue.

46. What age group do your patients fall into? *

- ◯ 18-42 years
- ◯ 43-65 years
- ◯ >65 years

47. How frequently do you use this robotic technology with your patients? (number of patients per year) *

- ◯ < 5 patients
- ◯ 5 to 10 patients
- ◯ < 10 patients

48. Do you find this robotic technology unnecessarily complicated and difficult to be used? *

- ◯ Yes
- ◯ No

49. Perchè? *

50. Do you think that the different functions of this robotic technology are well integrated and intuitive? *

- ◯ Yes
- ◯ No

51. Why? *

52. Did you find easy to explain to the patient how to use this robotic technology? *

- ◯ Yes
- ◯ No

53. Why? *

54. Do you think that setting up this robotic technology component takes too long (alignment, fitting,...)? *

- ◯ Yes
- ◯ No

55. Please, indicate the most critical aspects. *

56. Did you need a long time to learn how to assemble the prostheses with this robotic technology component? *

- ◯ Yes
- ◯ No

57. What difficulties did you find during your training period? *

58. Do you think that the use of this component with robotic technology provides added value to traditional components? *

- ◯ Yes
- ◯ No

59. Why? *

60. Regarding the orthopedic technique, do you think there are aspects of usability of this robotic technology that need to be improved (e.g. adjustment interfaces, assembly, reliability, weight, noise, ...)? *

- ◯ Yes
- ◯ No

61. Please, indicate which ones. *

SURVEY - Electronic Elbow DYNAMIC ARM/TMR DYNAMIC ARM

Please, answer the questions below reporting your experience with the prosthetic component at issue.

62. What age group do your patients fall into? *

- ◯ 18-42 years
- ◯ 43-65 years
- ◯ >65 years

63. How frequently do you use this robotic technology with your patients? (number of patients per year) *

- ◯ < 5 patients
- ◯ 5 to 10 patients
- ◯ < 10 patients

64. Do you find this robotic technology unnecessarily complicated and difficult to be used? *

- ◯ Yes
- ◯ No

65. Why? *

66. Do you think that the different functions of this robotic technology are well integrated and intuitive? *

- ◯ Yes
- ◯ No

67. Why? *

68. Did you find easy to explain to the patient how to use this robotic technology? *

- ◯ Yes
- ◯ No

69. Why? *

70. Do you think that setting up this robotic technology component takes too long (alignment, fitting,...)? *

- ◯ Yes
- ◯ No

71. Please, indicate the most critical aspects. *

72. Did you need a long time to learn how to assemble the prostheses with this robotic technology component? *

- ◯ Yes
- ◯ No

73. What difficulties did you find during your training period? *

74. Do you think that the use of this component with robotic technology provides added value to traditional components? *

- ◯ Yes
- ◯ No

75. Why? *

76. Regarding the orthopedic technique, do you think there are aspects of usability of this robotic technology that need to be improved (e.g. adjustment interfaces, assembly, reliability, weight, noise, ...)? *

- ◯ Yes
- ◯ No

77. Please, indicate which ones. *

SURVEY - Electronic Knee C-LEG4

Please, answer the questions below reporting your experience with the prosthetic component at issue.

78. What age group do your patients fall into? *

- ◯ 18-42 years
- ◯ 43-65 years
- ◯ >65 years

79. How frequently do you use this robotic technology with your patients? (number of patients per year) *

- ◯ < 5 patients
- ◯ 5 to 10 patients
- ◯ < 10 patients

80. Do you find this robotic technology unnecessarily complicated and difficult to be used? *

- ◯ Yes
- ◯ No

81. Why? *

82. Do you think that the different functions of this robotic technology are well integrated and intuitive? *

- ◯ Yes
- ◯ No

83. Why? *

84. Did you find easy to explain to the patient how to use this robotic technology? *

- ◯ Yes
- ◯ No

85. Why? *

86. Do you think that setting up this robotic technology component takes too long (alignment, fitting,...)? *

- ◯ Yes
- ◯ No

87. Please, indicate the most critical aspects. *

88. Did you need a long time to learn how to assemble the prostheses with this robotic technology component? *

- ◯ Yes
- ◯ No

89. What difficulties did you find during your training period? *

90. Do you think that the use of this component with robotic technology provides added value to traditional components? *

- ◯ Yes
- ◯ No

91. Why? *

92. Regarding the orthopedic technique, do you think there are aspects of usability of this robotic technology that need to be improved (e.g. adjustment interfaces, assembly, reliability, weight, noise, ...)? *

- ◯ Yes
- ◯ No

93. Please, indicate which ones. *

SURVEY - Electronic Knee RHEO XC

Please, answer the questions below reporting your experience with the prosthetic component at issue.

94. What age group do your patients fall into? *

- ◯ 18-42 years
- ◯ 43-65 years
- ◯ > 65 years

95. How frequently do you use this robotic technology with your patients? (number of patients per year) *

- ◯ < 5 patients
- ◯ 5 to 10 patients
- ◯ < 10 patients

96. Do you find this robotic technology unnecessarily complicated and difficult to be used? *

- ◯ Yes
- ◯ No

97. Why? *

98. Do you think that the different functions of this robotic technology are well integrated and intuitive? *

- ◯ Yes
- ◯ No

99. Why? *

100. Did you find easy to explain to the patient how to use this robotic technology? *

- ◯ Yes
- ◯ No

101. Why? *

102. Do you think that setting up this robotic technology component takes too long (alignment, fitting,...)? *

- ◯ Yes
- ◯ No

103. Please, indicate the most critical aspects. *

104. Did you need a long time to learn how to assemble the prostheses with this robotic technology component? *

- ◯ Yes
- ◯ No

105. What difficulties did you find during your training period? *

106. Do you think that the use of this component with robotic technology provides added value to traditional components? *

- ◯ Yes
- ◯ No

107. Why? *

108. Regarding the orthopedic technique, do you think there are aspects of usability of this robotic technology that need to be improved (e.g. adjustment interfaces, assembly, reliability, weight, noise, ...)? *

- ◯ Yes
- ◯ No

109. Please, indicate which ones. *

SURVEY - Electronic Knee GENIUM X3

Please, answer the questions below reporting your experience with the prosthetic component at issue.

110. What age group do your patients fall into? *

- ◯ 18-42 years
- ◯ 43-65 years
- ◯ > 65 years

111. How frequently do you use this robotic technology with your patients? (number of patients per year) *

- ◯ < 5 patients
- ◯ 5 to 10 patients
- ◯ > 10 patients

112. Do you find this robotic technology unnecessarily complicated and difficult to be used? *

- ◯ Yes
- ◯ No

113. Why? *

114. Do you think that the different functions of this robotic technology are well integrated and intuitive? *

- ◯ Yes
- ◯ No

115. Why? *

116. Did you find easy to explain to the patient how to use this robotic technology? *

- ◯ Yes
- ◯ No

117. Why? *

118. Do you think that setting up this robotic technology component takes too long (alignment, fitting,...)? *

- ◯ Yes
- ◯ No

119. Please, indicate the most critical aspects. *

120. Did you need a long time to learn how to assemble the prostheses with this robotic technology component? *

- ◯ Yes
- ◯ No

121. What difficulties did you find during your training period? *

122. Do you think that the use of this component with robotic technology provides added value to traditional components? *

- ◯ Yes
- ◯ No

123. Why? *

124. Regarding the orthopedic technique, do you think there are aspects of usability of this robotic technology that need to be improved (e.g. adjustment interfaces, assembly, reliability, weight, noise, ...)? *

- ◯ Yes
- ◯ No

125. Please, indicate which ones. *

SURVEY - Active Knee POWER KNEE

Please, answer the questions below reporting your experience with the prosthetic component at issue.

126. What age group do your patients fall into? *

- ◯ 18-42 years
- ◯ 43-65 years
- ◯ > 65 years

127. How frequently do you use this robotic technology with your patients? (number of patients per year) *

- ◯ < 5 patients
- ◯ 5 to 10 patients
- ◯ > 10 patients

128. Do you find this robotic technology unnecessarily complicated and difficult to be used? *

- ◯ Yes
- ◯ No

129. Why? *

130. Do you think that the different functions of this robotic technology are well integrated and intuitive? *

- ◯ Yes
- ◯ No

131. Why? *

132. Did you find easy to explain to the patient how to use this robotic technology? *

- ◯ Yes
- ◯ No

133. Why? *

134. Do you think that setting up this robotic technology component takes too long (alignment, fitting,...)? *

- ◯ Yes
- ◯ No

135. Please, indicate the most critical aspects. *

136. Did you need a long time to learn how to assemble the prostheses with this robotic technology component? *

- ◯ Yes
- ◯ No

137. What difficulties did you find during your training period? *

138. Do you think that the use of this component with robotic technology provides added value to traditional components? *

- ◯ Yes
- ◯ No

139. Why? *

140. Regarding the orthopedic technique, do you think there are aspects of usability of this robotic technology that need to be improved (e.g. adjustment interfaces, assembly, reliability, weight, noise, ...)? *

- ◯ Yes
- ◯ No

141. Please, indicate which ones. *

SURVEY - Electronic Ankle PROPRIO FOOT

Please, answer the questions below reporting your experience with the prosthetic component at issue.

142. What age group do your patients fall into? *

- ◯ 18-42 years
- ◯ 43-65 years
- ◯ > 65 years

143. How frequently do you use this robotic technology with your patients? (number of patients per year) *

- ◯ < 5 patients
- ◯ 5 to 10 patients
- ◯ >10 patients

144. Do you find this robotic technology unnecessarily complicated and difficult to be used? *

- ◯ Yes
- ◯ No

145. Why? *

146. Do you think that the different functions of this robotic technology are well integrated and intuitive? *

- ◯ Yes
- ◯ No

147. Why? *

148. Did you find easy to explain to the patient how to use this robotic technology? *

- ◯ Yes
- ◯ No

149. Why? *

150. Do you think that setting up this robotic technology component takes too long (alignment, fitting,...)? *

- ◯ Yes
- ◯ No

151. Please, indicate the most critical aspects. *

152. Did you need a long time to learn how to assemble the prostheses with this robotic technology component? *

- ◯ Yes
- ◯ No

153. What difficulties did you find during your training period? *

154. Do you think that the use of this component with robotic technology provides added value to traditional components? *

- ◯ Yes
- ◯ No

155. Why? *

156. Regarding the orthopedic technique, do you think there are aspects of usability of this robotic technology that need to be improved (e.g. adjustment interfaces, assembly, reliability, weight, noise, ...)? *

- ◯ Yes
- ◯ No

157. Please, indicate which ones. *

SURVEY - Electronic Ankle ELAN BATCHFORD

Please, answer the questions below reporting your experience with the prosthetic component at issue.

158. What age group do your patients fall into? *

- ◯ 18-42 years
- ◯ 43-65 years
- ◯ >64 years

159. How frequently do you use this robotic technology with your patients? (number of patients per year) *

- ◯ < 5 patients
- ◯ 5 to 10 patients
- ◯ > 10 patients

160. Do you find this robotic technology unnecessarily complicated and difficult to be used? *

- ◯ Yes
- ◯ No

161. Why? *

162. Do you think that the different functions of this robotic technology are well integrated and intuitive? *

- ◯ Yes
- ◯ No

163. Why? *

164. Did you find easy to explain to the patient how to use this robotic technology? *

- ◯ Yes
- ◯ No

165. Why? *

166. Do you think that setting up this robotic technology component takes too long (alignment, fitting,...)? *

- ◯ Yes
- ◯ No

167. Please, indicate the most critical aspects. *

168. Did you need a long time to learn how to assemble the prostheses with this robotic technology component? *

- ◯ Yes
- ◯ No

169. What difficulties did you find during your training period? *

170. Do you think that the use of this component with robotic technology provides added value to traditional components? *

- ◯ Yes
- ◯ No

171. Why? *

172. Regarding the orthopedic technique, do you think there are aspects of usability of this robotic technology that need to be improved (e.g. adjustment interfaces, assembly, reliability, weight, noise, ...)? *

- ◯ Yes
- ◯ No

173. Please, indicate which ones. *

Personalizza il messaggio di ringraziamento

The reply has been sent.
Thanks for your cooperation.