

1 The world is changing due to the COVID-19 pandemic.¹ Beyond the high numbers of deaths and
2 hospital and intensive care units (ICU) admissions,² COVID-19 heavily impacts patients requiring
3 rehabilitation.³ There is also great impact on professional activities; many countries, individuals and
4 families are going in a deep economic crisis.⁴ This is particularly true for professionals working in
5 outpatient services.

6 Outpatients suffer closure of services and/or travel restrictions.⁵ From the discovery of the epidemic
7 in our country, Italy, our outpatient institute suffered a rapid, progressive drop from 74.3±12.9
8 sessions per day (first 31 usual working days) to 46.8±18.0 in the next 13 days (p<0.001). These
9 numbers, and the urgent responsibility for safety of personnel and patients traveling from every Italian
10 region, forced a choice between closure or shift to telephysiotherapy.

11 Current evidence on telemedicine refers mostly to interventions not requiring hands-on approaches,
12 based on either technology or oral/visual interactions.⁶⁻⁸ Nevertheless, we mostly refer to
13 experimental trial while clinical wide application is scarcely reported. Telemedicine has been
14 suggested as a possible solution for rehabilitation in COVID-19 times.⁶ Recently, its efficacy in
15 reducing the loss of rehabilitation services has been shown.⁵ In a way, the pandemic offered a sudden
16 push to telemedicine. The question is: which lessons can we learn on telephysiotherapy after a few
17 months of extensive and mandatory experience?

18 Idiopathic scoliosis during growth can progress very rapidly in certain periods.⁹ Progression can in
19 turn lead to increased surgery rates.¹⁰ Leaving patients on their own can facilitate this progression
20 because of the absence of health professionals' direct examination or psychological support to
21 treatment.^{11,12} A sudden stop of all outpatient services impact not only on physicians', but also on
22 physiotherapists', professional activities. Evidence on the efficacy of scoliosis specific exercises is
23 constantly growing,¹³ but physiotherapists have also a role in terms of psychological support to
24 patients and counselling to continue bracing.^{10,14} Telemedicine could provide a solution.

25 In this perspective, we share the experiences (from March 16th to May 11th) by 38 physiotherapists of
26 the same institute acquired during 2 months of lockdown and exclusive telephysiotherapy practice.
27 This experience and the lessons learned can be of help to the wider community of physiotherapists
28 dealing with the COVID-19 pandemic impact on their professional lives. Moreover, it can give some
29 insights on when and how to apply telephysiotherapy after the pandemic ends. For generalizability
30 purposes, we present the available and newly developed factors that allowed the shift from usual face-
31 to-face care to telephysiotherapy.

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33 The setting of this experience

34 The authors' institute is a private tertiary referral, spinal outpatient rehabilitation facility, with 26
35 centres in Italy, particularly specialized in scoliosis and spinal deformities during growth. Treatments
36 are paid out-of-pocket, with frequent subsequent insurance reimbursement to patients. The Institute
37 is based on evidence (frequent changes in clinical practice), technological support (patients'
38 evaluation, data collection, external/internal communications), intra- and inter-professional
39 teamwork, and shared protocols. Since 2003 an informatic platform, web-based since 2006, collect
40 all patients' data respecting privacy regulations.

41 Evaluations and treatment programs are agreed and improved by the entire team, through regular
42 online meetings. Treatment plans for single patients follow guidelines granting individual freedom of
43 operative choices according to structured procedures. This system allows scientific work,¹⁵⁻¹⁷ and in
44 clinics patients' transfers among professionals, if needed.

Treatments are mostly based on home-practice. Patients exercise at home 10/20 minutes per day, and individual physiotherapy sessions are provided every 30-90 (deformities) or 7-15 (pain) days. During the sessions, physiotherapists perform evaluations, update and teach exercises (video record by caregivers), provide cognitive-behavioural approach and counselling. An App, synchronized with individual patients' file, manages treatment plans, exercise schemes and videos, compliance information (with motivational tools) and contacts between patients and physiotherapists.

Innovation to practice telephysiotherapy

Organization

Since the decision was taken, a written and video information campaign explained the need of limiting personal contacts, the expected length in time of these limitations (according to current evidence, longer than what communicated by the Government) and the choice to move almost completely to telephysiotherapy for safety of patients and personnel. In person sessions have not been completely excluded but are considered only when necessary. The biggest resistance to telephysiotherapy comes from the misunderstanding of the quarantine time, with the wrong idea that everything would have come back to normal in 2-3 weeks.

An important factor was the acceptance of change from face-to-face to telephysiotherapy. Usually, agendas are managed by the Institute booking service, but after the first phone calls it was clear that this unusual and unexpected change proposed by a secretary was not well received by the patients. Consequently, the new standard is that the proposal is made by phone call by the treating physiotherapist. This facilitates the interaction with the patient, and allows to professionally answer to all doubts, rationally describe strong and weak points of the new treatment procedure, and stress the possibility of having a normal cognitive-behavioural approach, whose importance has always been given also previously. Another facilitator was an ad-hoc discount, also provided to face the current economic difficulties.

In preparation to the session, patients receive by email detailed description with: instructions to download the App and installation tutorials; tutorials for construction of simple, domestic tools for the evaluations; tutorials of the home-evaluations to be performed before the session; list of simple home materials useful for the exercises; session setting description (cloths, informatic material).

How telephysiotherapy is provided

Involvement of caregivers and families is necessary for the session. For the growing age, this was easy since families have always been actively involved as team members: they video recorded the exercises, participated in the choice of home exercises' frequency and had physiotherapist e-mail and phone number for problem between sessions.

A free video communication App is used (Skype or WhatsApp). Evaluation results autonomously collected by patients with the help of caregivers are sent before the session to fill the assessment form in advance. One caregiver is present during the session, with one camera to film the patient, to help correcting mistakes and observe the right execution of specific exercises; a second device is used for the Institute App to record the exercises and, if possible, a second camera for an orthogonal view of patient's exercises execution is used.

During the session, the physiotherapist explains the exercises, whose graphical representation can be seen by the patient on the App. The patient works under direct and continuous visual control. If

necessary, hands-on is provided by caregivers under physiotherapist's guidance. To show where and how to act, photos are taken and used with graphic Apps while sharing the screen. When the execution is correct, the caregiver records patient's exercises performance with physiotherapist's voice description. Usual cognitive-behavioural approach is used throughout the session.

Results and experience achieved

Before the lockdown very few, occasional telephysiotherapy sessions were provided (~0%). During 2 months of lockdown, telephysiotherapy sessions have been 2,239 (100%). After the lockdown, when back to "normal" face-to-face hands-on physiotherapy, 10% (532 out of a total of 5,091) remained telephysiotherapy sessions. In table 1 the results of continuous quality improvement questionnaires are reported, compared to the previous year. For clinical results more time is required to collect information and data. In Table 2, we propose a first provisional checklist of factors to be considered to move clinically to telephysiotherapy. We also report how we dealt with them in the current experience.

The common feeling of patients and their caregivers was of not having been abandoned. In order of preference, they appreciated simplicity of instructions that allowed the session performance, the protocol reconversion speed, being part of the therapeutic team and the reduction of the costs. Conversely, physiotherapists referred availability of patients (who well equipped themselves with home material), atypical but very warm context (patients' homes), feeling of having been effective even in conditions of objective difficulty, increased emotional closeness with patients and caregivers. All physiotherapists were very happy with their experience, with no exceptions. Many testified started from a deep technologic ignorance but were happy of results.

The limits and drawbacks referred by physiotherapists and patients included the impossibility to use hands-on, the need to simplify the approach, the limited attention of younger patients, the connection difficulties. Most physiotherapists and patients agreed that this type of approach is perfect in emergency, but it cannot substitute normal physiotherapy sessions in normal times.

During these months we verified that the systems work properly. We also identified corrections to the tutorials and simplifications needed for the communication to patients and for the construction of the domestic assessment tools. This was based on all physiotherapists' suggestions and their direct experiences.

Conclusion

This wide and sudden experience is now available for the worldwide physiotherapy community. Any institute or individual professional has its own strengths, setting and starting points. Compared to this experience, it would be possible to identify individual point of actions to eventually move to physiotherapy in the high probability of being quarantined. In this Covid-19 pandemic we cannot just stop working, with not only the economic consequences for ourselves (and the society), but also with the health impact on our patients (and society). Telephysiotherapy is a not-so-difficult, readily available instrument.

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1 [Tables](#)

2 Table 1. Results of continuous quality improvement questionnaires

RATE OF ANSWERS	36 %	32 %
INSTRUCTIONS TO PREPARE FOR THE SESSION	2.8 7	2.8 0
EASINESS TO REACH THE AMBULATORY / TO CONNECT FOR TELEMEDICINE	2.6 5	2.6 3
ADEQUACY OF PREPARATORY INSTRUCTIONS	2.8 4	2.7 1
PRIVACY RESPECT	2.8 3	2.7 5
COURTESY OF OPERATORS TO EXPLAIN HOW TO PREPARE FOR PHYSIOTHERAPY	2.9 3	2.8 1
EASINESS OF ACCEPTANCE AND PAYMENT PROCEDURES	2.8 3	2.8 4
WAITING TIME BEFORE THE SESSION	2.8 5	2.7 4
RELATIONSHIP WITH PHYSIOTHERAPIST	2.9 5	2.9 0
CLEAR AND COMPLETE INFORMATION	2.9 5	2.9 5
COURTESY OF PHYSIOTHEARPIST	2.9 7	2.9 5
IN GENERAL, HOW SATISFIED ARE YOU FOR THE SERVICE PROVIDED?	2.7 9	2.8 5
WOULD YOU SUGGEST OUR SERVICE TO OTHERS IN THE SAME CONDITION?	2.7 6	2.8 9

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2 Table 2. Proposal of a checklist for clinical application of telephysiotherapy, applied to the current
 3 experience (Columns C to F). This scheme can serve as a basis for experiences to identify crucial
 4 factors for development. Each factor can work as a facilitator or an obstacle. NA: Not Applicable.

Checklist		Answers according to current experience			
A. Factor	B. Explanation	C. Organization	D. Physiotherapists	E. Patients	F. Comments
Need	They can be internal or external, but needs should be perceived by / stimulated in all actors	Risk of closure	Risk of workplace	Impossibility of face-to-face physiotherapy	Quarantine due to Covid-19 epidemic. Information campaign
Availability (to change)	Many changes are required at all level to adapt to the new “format”	Already existing		To be stimulated	Individual contacts with patients by physiotherapists
Project	Telephysiotherapy must be planned in advance	Vision and leadership	Ability to change instruments. Creativity to develop new tools	NA	Preparatory meetings and trials Progressive adaptation
Technology	Video-communication tools needed as a minimum standard	Available, partly developed/adapted		Free Apps and home material	Tutorial to be developed for patients
Interventions	Importance given to active patients' components and home practice	NA	Mostly exercises, education and cognitive-behavioural approach. Less hands-on techniques	NA	
Application	Adaptations required to the program	Management support	Use of everyday home tools. Provision of home treatment schemes	Videocamera(s) available. Caregivers involved	

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