

Telemedicine and opportunities in wound care.

An overview of solutions for beginners

Luc Téot

Montpellier University Hospital

Introduction

The COVID-19 outbreak has redefined the relationship between caregivers and patients.

During this period of containment, many patients have not been admitted by hospitals and clinics, and most caregivers have been unable to provide care at patients' homes.

It is time to think differently. In a recent article, we described a Randomized Controlled Trial (RCT) in which complete recovery was the primary outcome. We observed no differences between patients cared for via telemedicine and those who were treated at a reference centre.

Telemedical procedures – such as dressing changes – were carried out by an expert in wound care and the primary care nurse at the patient's home. This model can be extended throughout all developed countries and possibly around the globe. In many countries, reimbursement of telemedicine is an issue; however, during the COVID-19 pandemic, laws have been quickly adjusted to meet new demands and can be used to streamline patient tracking. Private companies can certainly help to cover some of the expenses, and organisations such as the European Wound Management Association (EWMA) could be crucial for data collection.

This article explains how telemedicine works and how we can rapidly propose solutions based on the French model.

In France, telemedicine was included in the public health code in October 2010. The decree specifies its different modalities: teleconsultation (patient seen from a distance), tele-expertise

Luc Téot. Telemedicine and opportunities in wound care. An overview of solutions for beginners.

(two health professionals analyse a medical case), telemonitoring (data recorded on a e-health devices and transmitted remotely), and the possibility of working in delegation with an expert nurse (cooperation protocol), which has made it possible to delegate certain tasks to paramedics and in-home caregivers.

Technical problems and solutions

1. Consumer solutions such as *WhatsApp* and *Viber* are not formally contraindicated by public authorities in terms of transmission security for videoconferencing. One limitation lies in the possibility of intruders acquiring the personal telephone number of a doctor, proving the existence of a link between a healthcare professional and a patient. Another limitation lies in exchanging data (pictures, files, x-rays, etc.); using these applications potentially exposes users to hackers, as they do not follow security transmission regulations.

2. Professional solutions such as *Teams* and *Zoom* further guarantee the confidentiality of videoconferences because a link is sent to the patient without the doctor's phone number. Such applications, however, neither allow secure communication between professionals nor file transfers.

3. Any file transfer comprising confidential information such as photos, biological examination reports, or radiography must be carried out with secure messaging applications on secure platforms.

4. Secure messaging systems are freely available to all healthcare professionals in France: they only need to make a request for the messaging system to be created. In most cases, the account is opened successfully and the email usually ends with `mms.fr`.

5. Web platforms, which can be either public or private, manage communication between users and facilitate the transfer of data. Bandwidth is calculated to allow secure videoconferences, as well as the secure transfer of sensitive data. The platform, therefore, makes it possible to organize teleconsultations, transfer data, and ensure that a consultation can continue for the time authorized by the legislator. Furthermore, data can be securely transferred to a medical record (hospital, private clinic, healthcare network, etc.).

6. Data can be stored in authorized healthcare data hosting databases, in computer files (for a limited time), or preferably in the patient's personal database.

7. Many solutions are available on the market, (165 in France) and public authorities are aiming to link patients' personal data with public and private healthcare professionals.

Patient data flow organizations in relation to telemedicine

1. In France, the regional group for assistance in the development of e-health (GRADES) is responsible for digital health policy in various regions, as well as upholding interoperability of telemedicine technologies as defined in national regulations. GRADES is responsible for the application of measures concerning:

- The digital hospital
- Digital health territories
- The operational directory of resources
- The deployment of telemedicine and the shared medical record
- The communicative oncology file
- Secure health messaging

2. Digital coordination support services have been deployed since 2017 in the regions in the E-course section. This is to allow all patients with complex or multiple pathologies to be able to quickly provide the entire computerized medical record to potential medical professionals and paramedics, health organizations, medico-social, and social coordinates (territorial platform of support, coordination assistance departments, health course for the elderly with loss of autonomy, etc.).

3. Coordination is taking up more and more space in the follow-up of care pathways for patients with complex needs. This coordination ensures a link between medical professionals and proposes simplifications in the implementation of care plans and medico-surgical follow-ups within healthcare facilities, at home, and in living structures.

4. It is sometimes supplemented by therapeutic education, which is part of the reinforcement of therapeutic proposals in order to implement them.

How to organize and plan telemedicine practices

Teleconsultation

It must be prescribed by the referring doctor.

To put a patient in contact with his doctor, the patient must be able to connect either via a phone or the Internet. Internet access is legally regulated and thus all users are entitled to it. A webcam is essential, either on the phone or on the computer.

The doctor's secretary must ensure that the connection can be tested before the teleconsultation. Prior to the teleconsultation, a link is sent to the patient and, when the doctor

Luc T ot. Telemedicine and opportunities in wound care. An overview of solutions for beginners.

is available, the patient is informed that he can activate the link. He then communicates with the doctor or his delegate.

For the healthcare professional, the process consists of two parts. First, there is procedure itself, which he performs with the help of a paramedic or an in-home caregiver. The exchange between the expert and the caregiver is extremely codified: the expert asks the nurse to explore the wound, to determine the length of undermining, to speak with the patient, and to evaluate the hygienic conditions of the room and surroundings. It is essential to the process to have specific activities performed by the caregiver under the supervision of an expert.

Second, the expert enters the data into the patient's medical record. For this reason, it is recommended that the expert have two screens – one for the video consultation and the other for the medical file. The report, including the care plan, is then sent to the attending physician. In France, the reimbursement for a 30-minute teleconsultation is equivalent to an in-person consultation under similar conditions; essentially, for a follow-up carried out at home or in a community home, the patient must have been examined physically by the same doctor during the last 12-month period.

Scheduling is carried out using the platform and wound care management software.

Preliminary information is collected by secretaries, and experts in wound care use specialised software to carry out the following:

- a) collect all administrative information concerning the patient;
- b) collect all medical information (comorbidities, wound evolution, pictures, etc.);
- c) schedule the date of the teleconsultation with the in-home caregiver (virtual rooms for teleconsultations will be filled by the secretary);

- d) inform the patient of the date and time of the appointment and test connectivity (web, 4G, 5G) with the nurse;
- e) send the caregiver an application that will be opened at the scheduled date and time;
- f) carry out the teleconsultation;
- g) finalise the care plan and send a prescription;
- h) send an invoice to the patient's health insurance provider.

Discussion

Two issues can be raised:

- 1) The effectiveness of telemedicine: As long as an expert is directing the local caregiver, his/her expertise may be fully realised. Guiding a caregiver in carrying out palpations, exploring underminings, measuring tissue density, analysing the colour of an inflammation, measuring temperature using a thermometer, and transferring data using a Bluetooth device are all common practices. The local caregiver can feel confident when directed by the expert and covered in terms of medico-legal liabilities. More than 21,000 telemedicine procedures in wound care have been carried out by the Network Languedoc Roussillon since 2013 (published in *Plastic Reconstructive Surgery*).
- 2) The cost of telemedicine: The cost of telemedicine was evaluated in the recent RCT, but it varies by country. In France, patients' travel expenses are covered by public insurance, so ambulances and medicalised taxis are reimbursed. In this context, the price of a telemedical procedure is half the price of an in-person consultation. In other contexts, the price is at least identical to an in-person consultation.
- 3) In term of legislation there is a huge heterogeneity between countries around the world; this is linked to a certain defiance towards telemedicine caused by articles into

which expertise in wound healing was uneven. In other more pragmatic countries, a scientific based organisation supported the development of a regular activity in telemedicine. Key elements are the video discussion between an expert and a non-expert in presence of the patient. In France, the non-expert nurse is since January 2020 encouraged financially to participate to a teleconsultation.

- 4) The insurance system reimbursement may not be developed in some countries as well as in others, but with the COVID 19 pandemic, it is time to quickly extend the capacity of following the patients at home to limit the risk of contamination. Private funds' and company's support should be mobilised in order to provide an adapted care in wound healing despite the present circumstances.

Conclusion

The actual period of COVID 19 pandemic limits the capacity to practice wound healing in normal conditions. Telemedicine has progressed from amateurism to a regulated practice. In this context, the relationship expert-patient should be realised with the help of local assistants (nurse, assistant nurse, etc.) and the active participation of the patient when possible. At this price, telemedicine has been extensively developed in some countries and should be considered as the best way to prevent contamination.

For more information, you can go to teleclinic.org

Luc T ot

Montpellier University Hospital, Montpellier, France
Chlo  Geri, MD, Julie Lano, MD, ...

First Published December 18, 2019 Research Article
<https://doi.org/10.1177/1534734619894485>

Article information



Abstract

Use of telemedicine has expanded rapidly in recent years, yet there are few comparative studies to determine its effectiveness in wound care. To provide experimental data in the field of telemedicine with regard to wound care, a pilot project named “Domoplaies” was publicly funded in France in 2011. A randomized, controlled trial was performed to measure the outcomes of patients with complex wounds who received home wound care from a local clinician guided by an off-site wound care expert via telemedicine, versus patients who received in-home or wound clinic visits with wound care professionals. The publicly funded network of nurses and physicians highly experienced in wound healing was used to provide wound care recommendations via telemedicine for the study. The healing rate at 6 months was slightly better for patients who received wound care via telemedicine (61/89; 68.5%) versus wound care professional at home (38/59; 64.4%) versus wound care clinic (22/35; 62.9%), but the difference was not significant ($P = .860833$). The average time to healing for the 121/183 wounds that healed within 6 months was 66.8 ± 32.8 days for the telemedicine group, 69.3 ± 26.7 for the wound care professional at home group, and 55.8 ± 25.0 days for the wound care clinic group. Transportation costs for the telemedicine and home health care groups were significantly lower than the wound clinic group, and death rate was similar between all the 3 groups ($P < .01$). Telemedicine performed by wound healing clinicians working in a network setting offered a safe option to remotely manage comorbid, complex wound care patients with reduced mobility.

Luc Téot. Telemedicine and opportunities in wound care. An overview of solutions for beginners.

Keywords [complex wounds](#), [telemedicine](#), [home care](#)

References

1. Chanussot-Deprez, C, Contreras-Ruiz, J. Telemedicine in wound care: a review. *Adv Skin Wound Care*. 2013;26:78-82. doi:[10.1097/01.ASW.0000426717.59326.5f](#)

2. Zarchi, K, Haugaard, VB, Dufour, DN, Jemec, GB. Expert advice provided through telemedicine improves healing of chronic wounds: prospective cluster controlled study. *J Invest Dermatol*. 2015;135:895-900. doi:[10.1038/jid.2014.441](#)

3. Rasmussen, BS, Froekjaer, J, Bjerregaard, MR, et al. A randomized controlled trial comparing telemedical and standard outpatient monitoring of diabetic foot ulcers. *Diabetes Care*. 2015;38:1723-1729. doi:[10.2337/dc15-0332](#)

4. Moore, Z, Angel, D, Bjerregaard, J, et al. eHealth in wound care – overview and key issues to consider before implementation. *J Wound Care*. 2015;24(suppl 5):S1-S44.

5. Neves, AL, Villanueva, T. French boost European telemedicine. *CMAJ*. 2011;183:E387-E388. doi:[10.1503/cmaj.109-3804](#)

6. Sood, A, Granick, MS, Trial, C, et al. The role of telemedicine in wound care: a review and analysis of a database of 5795 patients from a Mobile Wound-Healing Center in Languedoc-Roussillon, France. *Plast Reconstr Surg*. 2016;138(3 suppl):248S-256S. doi:[10.1097/PRS.0000000000002702](#)

7. Nelson, EA, Adderley, U. Venous leg ulcers. *BMJ Clin Evid*. 2016;2016:1902.

8. Niederauer, MQ, Michalek, JE, Liu, Q, Papas, KK, Lavery, LA, Armstrong, DG. Continuous diffusion of oxygen improves diabetic foot ulcer healing when compared with a placebo control: a randomised, double-blind, multicentre study. *J*

Wound Care. 2018;27(suppl 9):S30-S45. doi:[10.12968/jowc.2018.27.Sup9.S30](https://doi.org/10.12968/jowc.2018.27.Sup9.S30)

9. Guest, JF, Fuller, GW, Vowden, P, Vowden, KR. Cohort study evaluating pressure ulcer management in clinical practice in the UK following initial presentation in the community: costs and outcomes. *BMJ Open*. 2018;8:e021769. doi:[10.1136/bmjopen-2018-021769](https://doi.org/10.1136/bmjopen-2018-021769)

10. Trovato, MJ, Scholer, AJ, Vallejo, E, Buncke, GM, Granick, MS. eConsultation in plastic and reconstructive surgery. *Eplasty*. 2011;11:e48. Epub 2011 Nov 30.

11. Sparsa, A1, Doffoel-Hantz, V, Bonnetblanc, JM. Assessment of tele-expertise among elderly subjects in retirement homes. *Ann Dermatol Venereol*. 2013;140:165-169. doi:[10.1016/j.annder.2012.11.008](https://doi.org/10.1016/j.annder.2012.11.008)

12. Chanussot-Deprez, C, Contreras-Ruiz, J. Telemedicine in wound care. *Int Wound J*. 2008;5:651-654. doi:[10.1111/j.1742-481X.2008.00478.x](https://doi.org/10.1111/j.1742-481X.2008.00478.x)

13. Trial, C, Lano, J, Ribal, E, Palmier, S, T ot, L, Sicard, O. Mobile wound care and telemedicine centre: a decade of experience in the city-hospital wound healing network of the Languedoc-Roussillon Region. *J Wound Technol*. 2016;20.

14. Jelnes, R . Telemedicine in the management of patients with chronic wounds. *J Wound Care*. 2011;20:187-190.

15. J nsson, AM, Willman, A. Development of a consultation and teaching concept for leg wound treatment in home health care. *J Telemed Telecare*. 2007;13:236-240.

16. Stern, A, Mitsakakis, N, Paulden, M, et al. Pressure ulcer multidisciplinary teams via telemedicine: a pragmatic cluster randomized stepped wedge trial in long term care.

BMC Health Serv Res. 2014;14:83. doi:[10.1186/1472-6963-14-8](https://doi.org/10.1186/1472-6963-14-8)

17. Dobke, MK, Bhavsar, D, Gosman, A, De Neve, J, De Neve, B. Pilot trial of telemedicine as a decision aid for patients with chronic wounds. *Telemed J E Health*. 2008;14:245-249. doi:[10.1089/tmj.2007.0038](https://doi.org/10.1089/tmj.2007.0038)

18. Gardner, SE, Frantz, RA, Specht, JK, et al. How accurate are chronic wound assessments using interactive video technology? *J Gerontol Nurs*. 2001;27:15-20.

19. Hofmann-Wellenhof, R, Salmhofer, W, Binder, B, Okcu, A, Kerl, H, Soyer, HP. Feasibility and acceptance of telemedicine for wound care in patients with chronic leg ulcers. *J Telemed Telecare*. 2006;12(suppl 1):15-17.

20. Sarhan, F, Weatherburn, G, Graham, A, Thiyagarajan, C. Use of digital images in the assessment and treatment of pressure ulcers in patients with spinal injuries in community settings. *J Telemed Telecare*. 2010;16:207-210. doi:[10.1258/jtt.2010.004013](https://doi.org/10.1258/jtt.2010.004013)

21. Kim, HM, Lowery, JC, Hamill, JB, Wilkins, EG. Accuracy of a web-based system for monitoring chronic wounds. *Telemed J E Health*. 2003;9:129-140.

22. Wilbright, WA, Birke, JA, Patout, CA, Varnado, M, Horswell, R. The use of telemedicine in the management of diabetes-related foot ulceration: a pilot study. *Adv Skin Wound Care*. 2004;17(5 pt 1):232-238.

23. Nordheim, LV, Haavind, MT, Iversen, MM. Effect of telemedicine follow-up care of leg and foot ulcers: a systematic review. *BMC Health Serv Res*. 2014;14:565. doi:[10.1186/s12913-014-0565-6.7](https://doi.org/10.1186/s12913-014-0565-6.7)

24. Tchero, H, Noubou, L, Becsangele, B, Mukisi-Mukaza, M, Retali, GR, Rusch, E. Telemedicine in diabetic foot care: a systematic literature review of interventions and

Luc T ot. Telemedicine and opportunities in wound care. An overview of solutions for beginners.

meta-analysis of controlled trials. *Int J Low Extrem Wounds*. 2017;16:274-283.
doi:[10.1177/1534734617739195](https://doi.org/10.1177/1534734617739195)

25. Ting, X, Minjie, W, Hu, L, et al. Application of telemedicine system with 4G and high-resolution video in diagnosis and treatment of wounds between Wound Healing Department and Community Health Care Center in China. *Int J Low Extrem Wounds*. 2011;10:167-168. doi:[10.1177/1534734611420493](https://doi.org/10.1177/1534734611420493)