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CASE REPORT
Technology

Telemonitoring Wound Recovery with Smartphone: An Italian Experience during Pandemic Period

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Summary: An important problem of plastic surgeons is monitoring wound healing, loss of substance, and postsurgical scar in different pathologies of the skin. Face to face monitoring is expensive and cannot be performed in periods of social crisis such as the recent COVID-19 pandemic. The use of telemedicine techniques is rising in this field of healthcare, promising the same results as the standard follow-up with more flexibility and savings. The purpose of this case study was to evaluate the effectiveness of remote monitoring and treatment through remote follow-up using digital applications. We followed up 25 patients with postoperative or diabetic ulcers for a period of 6 months (ranging from 2 to 6 months). We have performed clinical assessments using the Scar Cosmesis Assessment and Rating scale, and we have measured patient satisfaction using questionnaires. We chose to use the application for smartphone, describing the types of ulcers, number and average consultations, and the type of recovery, whether partial or complete. Monitoring wound recovery was very easy, and the patients found the experience very satisfactory. The total number of consultations was 255 with a significant reduction in outpatient visits during the pandemic period. Telemedicine is a useful tool in wound management and can be used to provide an optimal health care service with no inferior results to standard care. *(Plast Reconstr Surg Glob Open 2023; 11:e5076; doi: 10.1097/GOX.0000000000005076; Published online 26 May 2023.)*

The management and treatment of acute and chronic wounds is one of the most frequent and costly fields of medicine: in Europe, it is estimated that 1.5–2 million people have this complication, with an impact of about 3% of public healthcare expenses.[1] One way to address healthcare spending that is rising in recent years is telemedicine, which is the diagnosis, treatment, and management of diseases using the modern technique of telecommunication.[2]

A 2020 systematic review concluded that the use of telemedicine techniques in the management of chronic wounds reflected the criteria of noninferiority with respect to usual practices.[3] In relation to the economic impact, the results recorded are instead contrasting.[4,5] The intent of our study is to report our experience with treatment of chronic and nonchronic injuries using mobile telemedicine applications, focusing on patients' satisfaction and ease of use in the older and unschooled populations (characteristics not yet thoroughly investigated in the literature).

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METHODS AND PATIENTS

We choose to use the app Imitowound to monitor wounds healing in follow-up of postsurgical scars. The surgeon can achieve, categorize, and precisely measure wounds directly at the point of care (width, length, circumference, area), thanks to a calibration system.

In this study, we have monitored ulcer or postoperative ulcer in 25 patients (Table 1) for a mean period of 6 months with a fast monitoring of topic treatment and infective complications. All the patients have expressed their consent to be followed up at a distance with the use of applicative telemedicine.

Clinical results were determined using the Scar Cosmesis Assessment and Rating scale.[6]

At the end of the follow-up, we have also asked the patients to answer six questions about their satisfaction with the telematic follow-up, with a score ranging from 0 (not satisfied) to 2 (very satisfied), with a total score of satisfaction of 12 (Table 2).

RESULTS

During the follow-up, the mean score of consultation was four out of 15 (ranging from 0 to 12); 22 of

Disclosure statements are at the end of this article, following the correspondence information.

Table 1. Patient Characteristics

	Patients (N = 25)
Men	8
Women	17
Age (y)	
Average	67
Range	55–82
Educational degree	
Elementary school	11
High school	10
College or higher	4
Smokers	8
HBP	6
HF	2
RF	3

HBP, high blood pressure; HF, heart failure; R, respiratory failure.

Table 2. Patient Satisfaction Survey

Patients' Satisfaction with Telematic Follow-up
• Are you satisfied with the telemedicine follow-up of the wound? 0/2
• Do you think you have been disadvantaged in having been followed up by telemedicine rather than in person? 0/2
• Has this application made it possible to obtain safe wound management? 0/2
• Has the application been practical to use? 0/2
• Has it been useful in this pandemic period? 0/2
• Would you recommend this application? 0/2

Table 3. Clinical Results

Wounds (N = 27)	21 Postoperative Ulcer, 6 Diabetic Ulcer
Width	1–4 cm
Deep	0.5–1 cm
SCAR scale	0–12 (mean 4/12)
No. of consultation	255
Time of follow-up (wk)	
Min	3
Max	24
Mean	10.75
Patient satisfaction	
Max	12
Min	7
Mean	10

27 wounds (81.4%; one diabetic ulcer and 21 postoperative ulcer) had complete healing, whereas five of 27 (12,5%; four diabetic ulcer and one postoperative ulcer) needed surgery revision (Table 3). The mean follow-up period was 10.75 weeks (ranging from 3 to 24 weeks). The mean number of consultations for a single patient was 22, with a range of five to 33. The total number of consultations was 255, with a total reduction of 255 visits to the clinic.

The management of 21 of 25 patients did not require access to the clinic during the monitoring via telemedicine for the low degree of complexity. In four of 25 patients, we had to interrupt the follow-up via telemedicine for surgical evaluation (Fig. 1). Apart from these four patients, we did not find any complications that required further intervention beyond the normal follow-up. The nonuse of advanced dressings made it possible to facilitate the remote management of wound healing. The average result for patients' satisfaction was 10 of 12 from the questionnaire proposed.

Takeaways

Question: Telemedicine allows for long-distance patient and clinician care. In this study we have tried to use a smartphone app to monitor the wound's healing.

Findings: Telemedicine can be considered as a healthcare service useful in monitoring non-complex wounds, reducing access to our clinic.

Meaning: Telemedicine had an important role in the pandemic period and in conditions of patients with disability.

DISCUSSION AND CONCLUSIONS

This study represents our first experience of using remote monitoring using this app. One of the advantages we have found is that when using this app, we have obtained a shorter waiting time to obtain a specialist consultation and avoided unnecessary follow-up consultation.

A problem identified in our experience was the difficulty encountered in the use of telemedicine applications by older population groups or those with a low level of education (most of our patients). Limits of our study were the low number of subjects enrolled and short period of follow-up. Unfortunately, we were unable to calculate the savings obtained by reducing the number of visits to the clinic, but previous observational studies have shown significant savings in the use of telemonitoring.[7]

Reducing the number of unnecessary visits to the clinic can have important implications for people with disabilities or in a state of pandemic such as in the last 2 years. Despite the low number of patient samples, we recorded a reduction of 255 accesses to our clinics during the pandemic period. At a time when remote follow-up has become necessary, developing remotely supervised solutions has a significant importance.

This way of follow-up will likely continue to grow and expand within plastic surgery moving forward, and we should continue to critically improve the specific aspects of these applications for effective implementation and enhance current clinical practices.

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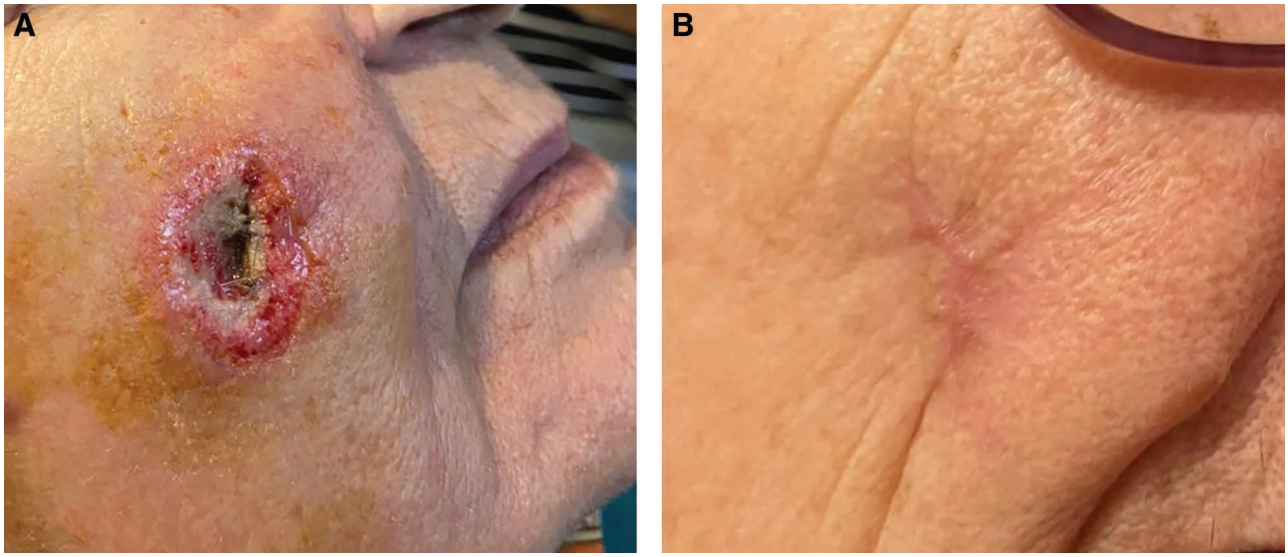

Fig. 1. We monitored via telemedicine the lesion for a period of 1 month before performing surgery. A, Preoperative wound. B, Postoperative wound.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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