RESEARCH ARTICLE

Patient and Clinician Perceptions about Remote Video Visits for Musculoskeletal Problems: A Qualitative Study

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Abstract

Background: An understanding of patient and clinician opinions about remote video musculoskeletal consultations might help determine how to increase appeal and utilization. The purpose of this study was to evaluate perceptions of remote video musculoskeletal consultations. Our research questions was what are patient and clinician facilitators and barriers for the use of remote video consultations?

Methods: Prior to the COVID-19 pandemic 27 English speaking adult patients seeking ambulatory care for a musculoskeletal problem, and 10 English-speaking musculoskeletal clinicians were interviewed using a guide. Interviews were audio-recorded, transcribed, and coded using applied thematic analysis.

Results: Patient and clinician incentives for remote video consultations included increased convenience, lower costs, less waiting time, and a better experience. Patient and clinician barriers to remote video consultations included concerns about familiarity with technology, lack of personal interaction and physical examination, inability to perform procedures, difficulties with reimbursement (clinicians), as well as technical, logistical, and privacy issues.

Conclusion: This qualitative study performed prior to the pandemic found that adoption of remote video consultation for musculoskeletal problems may improve with seamless, efficient, and effective care, at an affordable price, particularly if the human connection is similar to what occurs in person.

Level of evidence: Not applicable.

Keywords: Remote consultations, Virtual visits

Introduction

Technological advances make it possible for patients to be evaluated and treated through remote video consultations. Remote consultations can reduce costs and inconveniences for patients, and optimize stewardship of resources.

Despite initial evidence that virtual consultations are not inferior to in-person visits, they are used infrequently (1, 2). A prospective randomized trial found that comparable quality of care was provided among 600 patients seeing remote emergency medicine specialists, on-site emergency medicine specialists, or on-site general practitioners (3current practice, and a robust gold standard, and to assess the clinical effectiveness of this new technique. METHODS: Patients presenting to a peripheral hospital within 10 days of injury were separately assessed by each of: an emergency medicine specialist based at a district general hospital using telemedicine, a second on-site emergency medicine specialist, and an on-site general practitioner (representing current practice). Another study used Skype to evaluate 78 patients after total joint arthroplasty, and found fewer unscheduled visits, fewer phone calls, greater satisfaction compared to

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in-person visits (4). However, 37% of patients and nearly two thirds of physicians are reluctant to consider remote video consultation (5, 6).

The purpose of this study was to evaluate perceptions on remote video consultations in an orthopedic clinical setting. Our research question was what are patient and clinician facilitators and barriers for the use of remote video consultations?

Materials and Methods

The protocol was approved by the Institutional Review Board. Verbal informed consent was obtained from all patients and clinicians participating in the study. Participants received no compensation.

Participants
Patients

This study included English speaking new or returning patients aged 18 to 89 years seeking care at an ambulatory orthopedic or plastic surgery office in the United States for a musculoskeletal problem.

We pilot tested a pre-designed patient interview guide with five study eligible patients. Semi-structured qualitative interviews were conducted by a trained qualitative facilitator over a three-month period [Appendix 1]. Patients provided demographic information using an online questionnaire (age, gender, marital status, race, highest level of education, work status and insurance status).

Clinicians

English-speaking surgeons, physician assistants, or residents working in an orthopedic, plastic surgery, or spine surgery office were eligible for inclusion. Clinicians were recruited via email or phone to take part in this study. Semi-structured interviews were conducted by a trained research assistant, followed by a demographics questionnaire (age, gender, years in practice and specialty) [Appendix 2].

Data analysis

Debriefs and data summaries were completed by the facilitator after each interview. Interviews were audio-recorded and transcribed verbatim. Transcripts were reviewed and cleaned from identifying information by two independent research assistants. The interview data were analyzed using a thematic analysis framework (7). A codebook was developed as themes emerged. Two coders individually coded all transcripts and discussed discrepancies until consensus was reached. Quantitative data are described as means with standard deviation (continuous variables) and proportions (discrete variables).

Results
Sample characteristics

Twenty-seven patients were interviewed in person [Table 1]. None had prior experience with remote video consultations. Ten clinicians participated, of which three had prior experience with remote visits. These clinicians had stopped doing virtual consultations because of

technical, logistical, or contracting issues. Clinicians were interviewed over the phone (*n*=6) or in person (*n*=4).

Perceived facilitators for remote video consultations
Patient Perspectives

Twenty-one patients were open to replacement of return appointments with remote consultations. Three were open to an initial virtual consultation. Remote visits would take less time out of their day (*n*=23), and would not require them to leave the house, face traffic or find parking space. Consulting a clinician from a place of their choosing would make better use of waiting time (*n*=8) while avoiding exposure to contagious disease in a waiting room (*n*=3) [Tables 2; 3, quote 1]. Virtual visits could save money on fuel, parking and co-pays (*n*=10),

Table 1. Demographic overview		
Variables		
	Age	51 ± 18 (18-86)
	Gender, n (%)	
	Men	13 (48)
	Women	14 (52)
	Race/gender, n (%)	
	White/Caucasian	22 (81)
	Black/Afro-American	1 (4)
	Latino/Hispanic	4 (15)
	Marital status, n (%)	
	Married/unmarried couple	19 (70)
	Divorced/separated	2 (7)
	Single	5 (19)
	Widowed	1 (4)
	Highest education, n (%)	
Patient (N=27)	High school	9 (33)
	2-year college	4 (15)
	4-year college	11 (41)
	Post-college graduate degree	3 (11)
	Employment status, n (%)	
	Employed	14 (52)
	Unemployed	3 (11)
	Unable to work	2 (7)
	Retired	4 (15)
	Other (student, home maker, etc.)	4 (15)
	Insurance status, n (%)	
	Medicare	9 (33)
	Private	12 (44)
	Uninsured	5 (19)
	Worker's compensation	1 (4)

Table 1. Continued		
	Age	42 ± 8 (27-51)
	Gender, n (%)	
	Male	8 (80)
	Female	2 (20)
	Years in practice, n (%)	
	0-5 years	3 (30)
	6-10 years	2 (20)
	11-15 years	1 (10)
Physician (N=10)	>15 years	4 (40)
	Clinical role	
	Surgeon	7 (70)
	Physician assistant	2 (20)
	Surgical resident	1 (10)
	Current use of virtual communication with patients	
	Phone call	10 (100)
	Phone text	7 (70)
	Email	7 (70)
	Video chat	2 (20)

Continuous variables as mean ± standard deviation (range); discrete variables as number (percentage).

specifically when in-office visits aren't necessary (e.g. refilling prescriptions or letting clinicians know they are

doing well) (*n*=8).

Clinician Perspectives

For all clinicians (*n*=10), the main incentive for remote video consultations was patient convenience [Tables 2; 3, quote 2]. Additional benefits included increased provider efficiency, particularly on-call on nights, weekends and holidays (*n*=5); improving access to healthcare for patients avoiding inappropriate use of emergency services and catching problems earlier (*n*=2); increasing patient health literacy to manage their own care (*n*=2); and cutting back on healthcare spending by making typical clinician visits more efficient (*n*=1).

Perceived barriers to remote video consultations
Patient Perspectives

Barriers to remote video consultations included not knowing how to operate a device to make video calls (*n*=10), no access to internet or a smartphone/tablet (*n*=7), difficulty experiencing empathy and reassurance from their clinician during a virtual consultation (*n*=12) [Table 3, quote 3], inferior diagnosing and monitoring (*n*=18), privacy and confidentiality violation concerns including people listening to the conversation outside of the screen and information being shared without consent (*n*=4) [Appendix 3, quote 3], and potential technical issues during the virtual consultation including bad connection, delayed and grainy images or sounds and difficulty hearing the clinician (*n*=9) [Table 3, quote 5]. Remote consultations might require patients to take a more leading role in managing their own healthcare, which they might be unable or unwilling to do, while some patients expected difficulty staying focused when not in the same room with the clinician (*n*=7) [Table 3,

Table 2. Illustrative quotes				
Category	n	*Patient*	*n*	*Physician*
Facilitators for virtual visits				
Convenience, comfort and money incentives	23	"And then I can go back home and schedule it at my own convenience and the doctor's convenience... or the staff's convenience... to do another virtual call and to read the results! I have still lived my life in between. I haven't wasted my time in the doctor's office" (#24)	10	"I get satisfaction out of not having the patient take a part out of their day for just a simple thing, like a postoperative evaluation after three months [...] We have offered it for instance to mothers with young children, and it is a real lift for them to come to clinic and have to deal with childcare or have to take their children with them and all that... they are very much interested. Or people who are extremely busy. I think generally it would have very high uptake to patients who have barriers getting in, so patients who can't get a ride or get transport or people who can't drive themselves" (#3).
Barriers to virtual visits				
Age	14	"You have to understand, that at my age it is kind of miraculous to see my grandson on a screen talking to me! So, older people might be a little bit more uncomfortable with it I think. But if they did it, in time too, they would be fine" (#18)	4	"I think the patients that will self-select in are the patients who are very busy and want to minimize the time it takes to receive advice from their doctor. On the opposite side there are patients who have retired, have the time and want to come in to see the doctor" (#4)
Socio-economic status and ethnicity	-	-	2	"I think our patient population would think that we are ignoring them... specifically the MAP [local medical access program] population. I hear them say: Oh, this is the MAP clinic, you don't want to treat me because I have MAP, or you won't see me because I have MAP" (#1)

Table 2. Continued

Patient attitude and self-efficacy	7	"I am going to relate to my sister. Unless you have her in the clinic and you have her pinned down for a length of time, she is going to get on the video call and say everything is fine [...] Left on her own device, especially when it is her that has to take the action, o my god it is not going to happen" (#13)	1	"It would require a little bit of a shift from our former paternalistic vision in which a patient comes to you for help and says: 'Doctor, what am I supposed to do', to people having more self-efficacy and realize they have the problem. They would just have some questions they want answered... and try reaching out through telemedicine to do that. But also, understand that they have limited knowledge about things that may be happening in their body, and by not coming in and seeing a physician they may forfeit some of the diagnoses that can be recognized during a physical exam" (#3)
Patient digital health literacy	7	"I think older patients just aren't comfortable with technology, right? They didn't grow up with a phone in their hand. When would they have the tablet, phone or laptop to actually do it? Because a lot of them have very old computers, and they may not have a webcam, and I feel like they would just kind of be frustrated to try and get it to work. Unless it was very easy, like you just click a button and the video opens. But I think for younger people it would be fine" (#19)	2	"The same goes for patients who are older and less trusting of technology or less used to communicating over internet" (#4)
Trust in physician	10	"It would depend on the doctor and on what kind of visit it is. If it's just a clear-cut follow-up and nothing is bothering you, then I understand that and I would trust the doctor. Does the doctor feel like it's OK to do a follow-up? That would be a question for the doctor" (#18)	-	"And when they know videoconferencing was available, they might push to do that because it's more convenient for them. But you might wind up compromising them for the sake of convenience" (#2)
Personal interaction / rapport building	12	"You know there is something good about personal contact with the physician for me. Does it matter in the long run? I'm not sure. It's just... something about it makes it a better experience. And I think though you can't quantify it, in the long run you'd be healthier for it [...] I guess you could do that virtually, but not as easily as you could do that in person" (#10)	5	"The only hesitance I have is that I think... I feel like you are missing out a little bit on the human side of medicine. For instance, say we do a carpal tunnel release, and you just never see them again, or only virtually... There is something to be said about being in the same room, some sort of connection" (#8)
Physical examination / procedures	18	"Well, I don't think you can do virtual visits for a long period of time. Sometimes, I don't think that a patient is necessarily a good diagnostician on how they are improving, or how your gait is when they walk down the hall. So, I think that sometimes you need to have more than just a face on the phone, to really have the professional guess and see how the progress has been. I have been told that I am a poor historian about what is happening with myself" (#13)	-	"I feel like a lot of what we do has to do with dealing with anxiety, calming people down and I think thats a lot more easy to do when you look people in the eye, than over the phone [...] I think, this sounds peculiar, i think there are patients that by touching feel better. People just feel more comfortable when you touch them and examine them and just want to be reassured that nothing is wrong, I mean seriously wrong" (#9)
Technology	9	"It would be hard if the speed would be low, something like that. Because you want real time and not some kind of delayed images. Especially with the doctor, talking about your health. If the connection is not perfect, that would be kind of lame" (#15)	6	"Based on absolutely nothing, I have fear of technology.... I just think it is so much easier to pick up my phone, than to install the whole think and for the patient to do it too. It seems like it would take a couple of extra steps" (#8)
Logistics	v	"Well, the unknown variable is the availability for an actual visit. So, if somebody tells me that I can see the doctor via Skype in a week, or choose between that and seeing the doctor in 6 months in person, then that would obviously be an issue" (#7)	3	"[In my previous experience] it made the evaluation a little longer than it typically would be, because I think he [the patient] felt he just had the time to chat. I think this person saw it as a casual chat, instead of a physician evaluation [...] He didn't see there were other patients in clinic, he didn't see the waiting room, and have appreciation for that fact that I needed to see lots of other people too" (#2)

AN INSIGHT IN HOW REMOTE VIDEO CONSULTATIONS COULD BE MADE MORE APPEALING

Table 2. Continued				
Privacy	4	"How do I know... how do I know who is in the other room, on their end? Who else is watching the monitor? How am I to know that? That could be an invasion of privacy" (#1)	1	"They probably have a lot of questions about HIPAA, like if their information was being shared and privacy concerns" (#9).
Costs	v	"It seems like a lot of overhead might be reduced. you don't have to have the nurse check you in, you don't have to change clothes if you have to change clothes... If it is all covered by insurance I don't care, and that is the big thing. Because having only Medicare for the last few years, it is just amazing what is not covered" (#13)	6	"I actually think it would cost you just as much, because you have to hire someone to get it installed and make it HIPAA compliant and that will be challenging. We can't even get our computer system to get an interpretor on the phone, even that's too complicated" (#9)

quote 6]. For two (older) patients the office consultation was a social activity they did not want to replace with a remote consultation.

Clinician perspectives

Virtual consultation might increase uneven access to healthcare, for example for older patients having difficulty setting up a virtual connection, for patients without access to a phone, tablet or internet) (*n*=8), and for people from lower socio-economic status might perceive they are being denied (in-person) services (*n*=1) [Table 3, quote 7]. There is a potential to miss non-verbal cues (*n*=5) [Table 3, quote 8] and it could be difficult to calm and reassure patients remotely (*n*=2) [Table 3, quote 9]. Technical issues were brought up by those who had (*n*=3) and had not (*n*=3) used remote video visits in the past, including software malfunction, user-unfriendly interface and the need for training with a new technical solution (*n*=6). Remote consultations could take longer than in-person visits (*n*=3), for example because of difficulty implementing the remote consultations within the existing clinic workflow, or because of perceived decreased oversight and control over a "virtual waiting room" as opposed to an in-clinic waiting room. There were concerns about comparable reimbursement for virtual consultations (*n*=6) [Table 3, quote 10].

Discussion

Remote video consultations offer potential advantages to patients and the healthcare system, but they are new and unfamiliar. Considering the small but growing number of studies supporting the use of remote video options in orthopedic or general trauma settings, there seems to be a relatively slow adoption. In this study, we sought patient and clinician related barriers and facilitators to the use of remote video consultations for musculoskeletal problems.

The main incentives for patients to use remote video consultations observed in our study--convenience and efficiency--are consistent with prior studies (2–4). Remote consultations saved eleven unscheduled in-

clinic visits and 36 medical advice calls, adding up to a total of 288 minutes of saved time over the course of one study (4). However, other studies found no difference or increased consultation time when comparing virtual visits to in-clinic visits (2, 3). Perhaps these studies highlight an important distinction between efficiency of remote initial versus return visits; the first study included only return visits while the latter two studies additionally evaluated first patient encounters.

The observation that the main clinician incentive was patient convenience suggests potential changes in care delivery. For instance, remote consultations could be more easily offered outside of the usual office hours, potentially increasing access to healthcare. In some settings, people wait as long as six to twelve months for musculoskeletal specialty care (8, 9). Implementation of remote video consultations could increase access by reducing waiting time. Further, clinicians suggested that the potential lower costs of remote consultations could improve patient access to healthcare. The United States spends over $2.9 trillion on healthcare every year, of which an estimated $200 billion are avoidable and unnecessary (10). Studies showed that web-based follow-up assessment had a lower cost per patient compared with in-person follow-up from both societal and health-care payer perspectives (11, 12).

The observation that patient barriers included concerns about privacy, attention, thoroughness, and warmth suggest that patients are most concerned about relationship building, particularly if there are technical problems. Such concerns are usually alleviated once people have a good experience participating in a remote visit, which are associated with high satisfaction (13–15). In a study of 399 primary care remote video evaluations, 372 patients rated the visit as high quality, 379 felt it was secure and private, and 315 thought it was as thorough as an in-person visit (16). A similar study of 152 patients with hypertension, diabetes, hypercholesterolemia or acute illness, found virtual visits similar to face-to-face visits on most measures, including time spent with the clinician, ease of the interaction and personal aspects of

the interaction (17).

Clinicians have a valid concern that remote video consultations may not be equally accessible to all patients, something previously documented (18–20). Patients with lower levels of education; Black, Latino and Filipino patients, and senior patients seem to have less access to electronic health resources (21-23). Potential technical difficulties arising during a virtual visit might especially affect poor people and elderly patients with hearing impairment, which could exacerbate health disparities among vulnerable populations (24). On the other hand, immobile and dependent patients, patients living far from the hospital, patients with a busy job and patients that travel might have better access to remote healthcare than in-person consultation. In addition to accessibility, digital confidence and independence (self-efficacy) and digital health literacy, could play a role in patient willingness and capability to engage in remote consultations. A study with 1204 patients aged 18 to 91 years reported that older adults indicated more computer anxiety and lower computer self-efficacy than did younger and middle-aged adults (25). In that study, women reported higher computer anxiety, lower computer self-efficacy, lower general computer attitudes and less interest in computers than did men. Another study concluded that self-efficacy was associated with both older people's intention to use, and their actual use of technology (26). Interestingly, research to date suggests that remote video consultations do not increase self-efficacy or patient engagement (27–29). One way to potentially increase this might be to hand out a transcript or summary of what was said during the conversation, to read over at another time.

Several limitations to this study have to be acknowledged. First, consistent with qualitative research methods, our sample size was limited to one geographical area in Texas, and only included patients seen by orthopedic, plastic, and spine specialists. Therefore, our data might not be generalizable to other patient and clinician populations. Second, some clinician participants had prior experience with the use of video consultations for musculoskeletal problems, which may have influenced their responses. However, we believed this made our study sample more representative. Third, most clinician interviews were conducted over the phone. While this made participation for clinicians more convenient, we were unable to assess nonverbal cues during interviews. Despite these limitations, the study findings have provided a rich insight into patient and clinician perceptions on the use of remote video consultations for musculoskeletal problems.

The adoption of remote video consultation for musculoskeletal problems may improve with seamless, efficient and effective care, at an affordable price, particularly if the human connection is similar to what occurs in person. To make the option of a remote video visit more appealing, clinicians might consider training to perform video visits, anticipation of potential socioeconomic, cultural, and trust issues. Future studies might address the impact of remote video visits on the dynamic of the patient-clinician relationship.

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References

1. Armfield NR, Bradford M, Bradford NK. The clinical use of Skype—For which patients, with which problems and in which settings? A snapshot review of the literature. International Journal of Medical Informatics. 2015; 84(10):737-42.

2. Buvik A, Bugge E, Knutsen G, Småbrekke A, Wilsgaard T. Quality of care for remote orthopaedic consultations using telemedicine: a randomised controlled trial. BMC health services research. 2016; 16(1):483.

3. Benger JR, Noble SM, Coast J, Kendall JM. The safety and effectiveness of minor injuries telemedicine. Emergency medicine journal. 2004; 21(4):438-45.

4. Sharareh B, Schwarzkopf R. Effectiveness of telemedical applications in postoperative follow-up after total joint arthroplasty. The Journal of arthroplasty. 2014; 29(5):918-22.

5. Dietsche E. 82% of consumers do not use telehealth, survey says. https://medcitynews.com/2017/12/consumers-telehealth/

6. Thranberend T. Video Consultations. An Effective Tool for Outpatient Care - Acceptance among Doctors Is Key to Leveraging Usage. 2015.

7. Guest G, MacQueen KM, Namey EE. Applied thematic analysis. Sage publications; 2011.

8. Cook NL, Hicks LS, O'Malley AJ, Keegan T, Guadagnoli E, Landon BE. Access to specialty care and medical services in community health centers. Health Affairs. 2007; 26(5):1459-68.

9. Felt-Lisk S, McHugh M, Howell E. Monitoring

local safety-net providers: do they have adequate capacity? Health Affairs. 2002; 21(5):277-83.

10. National Health Expenditures 2016 Highlights. https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/downloads/highlights.pdf, 2018.

11. Marsh JD, Bryant DM, MacDonald SJ, Naudie DD, McCalden RW, Howard JL, et al. Feasibility, effectiveness and costs associated with a web-based follow-up assessment following total joint arthroplasty. The Journal of arthroplasty. 2014; 29(9):1723-8.

12. Marsh J, Hoch JS, Bryant D, MacDonald SJ, Naudie D, McCalden R, et al. Economic evaluation of web-based compared with in-person follow-up after total joint arthroplasty. JBJS. 2014; 96(22):1910-6.

13. Müller KI, Alstadhaug KB, Bekkelund SI. Acceptability, feasibility, and cost of telemedicine for nonacute headaches: a randomized study comparing video and traditional consultations. Journal of medical Internet research. 2016; 18(5):e140.

14. Bradbury A, Patrick-Miller L, Harris D, Stevens E, Egleston B, Smith K, et al. Utilizing remote real-time videoconferencing to expand access to cancer genetic services in community practices: a multicenter feasibility study. Journal of medical Internet research. 2016; 18(2):e23.

15. Polinski JM, Barker T, Gagliano N, Sussman A, Brennan TA, Shrank WH. Patients' satisfaction with and preference for telehealth visits. Journal of general internal medicine. 2016; 31(3):269-75.

16. McGrail KM, Ahuja MA, Leaver CA. Virtual visits and patient-centered care: results of a patient survey and observational study. Journal of Medical Internet Research. 2017; 19(5):e177.

17. Dixon RF, Stahl JE. A randomized trial of virtual visits in a general medicine practice. J Telemed Telecare. 2009; 15(3):115-117.

18. Kontos EZ, Emmons KM, Puleo E, Viswanath K. Communication inequalities and public health implications of adult social networking site use in the United States. Journal of health communication. 2010; 15(sup3):216-35.

19. Chou WY, Hunt YM, Beckjord EB, Moser RP, Hesse BW. Social media use in the United States: implications for health communication. Journal of medical Internet research. 2009; 11(4):e48.

20. Beckjord E, Rutten LF, Squiers L, Arora N, Volckmann L, Moser R, et al. Use of the internet to communicate with health care providers in the United States:

estimates from the 2003 and 2005 Health Information National Trends Surveys (HINTS). Journal of medical Internet research. 2007; 9(3):e20.

21. Kontos E, Blake KD, Chou WY, Prestin A. Predictors of eHealth usage: insights on the digital divide from the Health Information National Trends Survey 2012. Journal of medical Internet research. 2014; 16(7):e172.

22. Gordon NP, Hornbrook MC. Differences in access to and preferences for using patient portals and other eHealth technologies based on race, ethnicity, and age: a database and survey study of seniors in a large health plan. Journal of medical Internet research. 2016; 18(3):e50.

23. Nundy S, Razi RR, Dick JJ, Smith B, Mayo A, O'Connor A, et al. A text messaging intervention to improve heart failure self-management after hospital discharge in a largely African-American population: before-after study. Journal of Medical Internet Research. 2013; 15(3):e53.

24. Bartlett EE, Grayson M, Barker R, Levine DM, Golden A, Libber S. The effects of physician communications skills on patient satisfaction; recall, and adherence. Journal of chronic diseases. 1984; 37(9-10):755-64.

25. Czaja SJ, Charness N, Fisk AD, Hertzog C, Nair SN, Rogers WA, et al. Factors predicting the use of technology: Findings from the center for research and education on aging and technology enhancement (CREATE). Psychology and aging. 2006; 21(2):333.

26. van Houwelingen CT, Ettema RG, Antonietti MG, Kort HS. Understanding older people's readiness for receiving telehealth: Mixed-method study. Journal of medical Internet research. 2018; 20(4):e123.

27. Chumbler NR, Li X, Quigley P, Morey MC, Rose D, Griffiths P, et al. A randomized controlled trial on stroke telerehabilitation: the effects on falls self-efficacy and satisfaction with care. Journal of telemedicine and telecare. 2015; 21(3):139-43.

28. Emme C, Mortensen EL, Rydahl-Hansen S, Østergaard B, Svarre Jakobsen A, Schou L, et al. The impact of virtual admission on self-efficacy in patients with chronic obstructive pulmonary disease–a randomised clinical trial. Journal of Clinical Nursing. 2014; 23(21-22):3124-37.

29. Hansen MM. A feasibility pilot study on the use of complementary therapies delivered via mobile technologies on Icelandic surgical patients' reports of anxiety, pain, and self-efficacy in healing. BMC complementary and alternative medicine. 2015; 15(1):92.

Appendix 1. Patient-related barriers and facilitators for implementing remote video consultations in the orthopedic clinical setting.

1. What do you like about coming into the doctor's office?
2. What do you not like about coming to your doctor in the office?
a. Probe: what are some barriers to in-person check-ups?
3. Let's say you are able to complete a check-up by video chat. What is your initial reaction to this?
4. We know that coming into the clinic can be a burden for some patients since it takes time out of your day to come here. Tell me how willing you are to try virtual appointments if it will save time?
5. Do you have any technical problems making and receiving a phone call?
6. If you were told you could have a visit with your doctor by video, what do you think could be difficult about that?
7. Do you use video apps on your phone or computer like skype, Facebook or facetime? Do you have any problems using them?
8. In your opinion, do you think that patients will pay the same for a phone or video check-up as for an in-person check-up?
a. What are reasons they (will/will not) pay the same?
9. What are some things that patients might miss out on if they do the check-up by phone or video rather than in person?
10. If doctor offices plan to start scheduling phone and video visits regularly, what do you think patients will say about that?
a. How would you address some of these concerns?
11. Suppose you were in a lot of pain before the next appointment, would you want that to be in person or virtual?
12. On a scale of 1-10 (1 is not likely at all and 10 is sign me up now), what's the likelihood you would choose a phone or video check-up over an in-person check-up? Why not a 10 (or why did you say a 10)?

Appendix 2. Clinician-related barriers and facilitators for implementing remote video consultations in the orthopedic clinical setting.

1. It is now allowed to evaluate patients by video. What is your initial reaction to this?
2. If the technology and logistics were arranged for you to do new patient evaluations by video, would you try it?
a. Why or why not?
3. What would be better by video?
4. What would be worse?
5. What do you not like about in-person visits?
a. Can any of these things be improved using video conference technology?
6. Can you think of situations that might make virtual visits difficult?
7. In your opinion, do you think that patients will pay the same for a phone or video check-up as for an in-person check-up?
a. What are reasons they (will/will not) pay the same?
8. What are some things that patients might miss out on if they do the check-up by phone or video rather than in person?
9. If doctor offices plan to start scheduling phone and video visits regularly, what do you think patients will say about that?
a. How would you address some of these concerns?
10. What percentage of new evaluations could you do by video?
11. On a scale of 1-10 (1 is not likely at all and 10 is sign me up now), what's the likelihood you would choose a phone or video check-up over an in-person check-up? Why not a 10 (or why did you say a 10)?

Appendix 3. Quotes

1. "What I don't like: waiting rooms don't feel sanitary to me. I feel like there are all sorts of things going on. I also have three kids [...] I don't have time to go to the doctor's office and I don't want to bring the kids in. Unlike in orthopedics, most doctor's offices have sick patients, especially in the pediatrician's office. And I don't like the waiting room and the process and the insurance card. All that time is wasted and I just want to get it done" (#24).
2. "I think it would be providing the same service for a lower cost to the society, to the patient, and to the payer" (#3).
3. "... then maybe you can have that trust and be like, OK you can see me through the phone and actually see what is going on. But if you don't have that trust in your doctor, I think you wouldn't be able to feel secure about it over the phone" (#4).
4. "I would hardly understand him, because I'd be having my mind on some other thing" (#8).
5. "... [physicians would be] missing something they could have picked up on during a personal visit, a diagnosis of your condition or maybe something else to help you" (#2).
6. "I think our patient population would think that we are ignoring them...specifically the MAP [local medical access program] population. I hear them say: Oh, this is the MAP clinic; you don't want to treat me because I have MAP, or you won't see me because I have MAP (#1).
7. "It would require a little bit of a shift from our former paternalistic vision in which a patient comes to you for help and says: 'Doctor, what am I supposed to do', to people having more self-efficacy and realize they have the problem. They would just have some questions they want answered... and try reaching out through telemedicine to do that. But also, understand that they have limited knowledge about things that may be happening in their body, and by not coming in and seeing a physician they may forfeit some of the diagnoses that can be recognized during a physical exam" (#3).
8. "You get all the vocal, tone and timbre, but if you have the camera pointed at their knee you miss some other non-verbal cues, body-language and their expression during the consultation [...] Like, there are a lot of patients who have a surgical indication, but who should not have surgery, and if you are not able to see all of the information, then you might not make the right choice" (#4).
9. "I don't see how you would be able to build an insurance structure for a new patient consult. You would not be able to fulfill all the criteria for a level III consult ... speaking out of ignorance, maybe there is some law about how you could do that, but I don't see how because clearly your evaluation would not be as complete through only a visual one (#2).