Tele-Untethered: Telemedicine Without Waiting Rooms

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Background and Objectives: Telemedicine bridges the gap between care needs and provider availability. The value of telemedicine can be eclipsed by long wait times, especially if patients are stuck in virtual waiting rooms. UCSD Tele-Untethered allows patients to join visits without waiting in virtual waiting rooms. Tele-Untethered uses a text-to-video link to improve clinic flow, decrease virtual waiting room reliance, improve throughput, and potentially improve satisfaction. **Methods:** This institutional review board (IRB)-approved quality improvement pilot (IRB #210364QI) included patients seen in a single vascular neurology clinic, within the pilot period, if they had a smartphone/cell phone, and agreed to participate in a flexible approach to telehealth visits. Standard work was disseminated (patient instructions, scripting, and workflows). Patients provided a cell phone number to receive a text link when the provider was ready to see them. Metrics included demographics, volumes, visit rates, percentage seen early/late, time savings, and satisfaction surveys. **Results:** Over 2.5 months, 22 patients were scheduled. Of those arriving, 76% were "Tele-Untethered" and 24% were "Standard Telemedicine." Text-for-video link was used for 94% of Tele-Untethered. Fifty-five percent were seen early. There was a 55-minute-per-session time savings. **Conclusion:** This UCSD Tele-Untethered pilot benefitted patients by allowing scheduling flexibility while not being tied to a "virtual waiting room." It benefited providers as it allowed them to see patients in order/not tied to exact times, improved throughput, and saved time. Even modest time savings for busy providers, coupled with Lean workflows, can provide critical value. High Tele-Untethered uptake and use of verbal check-in highlight that patients expect flexibility and ease of use. As our initial UCSD Tele-Untethered successes included patient flexibility and time savings for patients and providers, it can serve as a model as enterprises strive for optimal care and improved satisfaction. Expansion to other clinic settings is underway with a mantra of "UCSD Tele-Untethered: Your provider can see you now."

Key words: model, satisfaction, telemedicine, untethered, waiting

In today's technological era, customers expect on-demand access to products and services. Consumers no longer wait in lines, opting instead for an "untethered" experience where they go about their business and have the restaurant page them when their table is ready, or the airline call them when they are next in line. As health care consumers, patients have similar expectations. Telemedicine bridges the gap between care needs and provider availability, reducing barriers to health care access related to geography, time, or travel. Telemedicine has evolved into a valuable resource for the delivery of clinical care to patients at a distance[1] and has expanded into academic clinical practices.[2] Since the onset of COVID-19, telemedicine has expanded exponentially to ensure medical "un-distancing" despite social distancing needs.[3,4] Although the provision of ambulatory care by video visit is now commonplace, optimization has lagged. Common issues including scheduling difficulties, communication among participants when video visits fail or are delayed, extended clinic sessions, prolonged virtual waiting room wait times, and decreased visit volumes all can result in decreased satisfaction for both providers and patients. Although telemedicine is improving access, scheduling is still complex, and patients have not realized the "on-demand" or "un-tethered" parallelisms they experience in other consumer-driven scenarios. One of the key drivers of patient satisfaction is "wait times."[5] The value of telehealth appointments can be eclipsed by long wait times, especially if patients are stuck in virtual waiting rooms with no human touch points to

give them updates. Patients can feel out of touch, uncertain as to the cause of delay or the expected time frame for their visit. Similarly, when providers know they are running late, communicating with waiting patients is complex, requiring the provider to check in with a nurse or medical assistant and relay information back to the waiting patient, whose device is likely now locked/being used (waiting in a virtual waiting room) and difficult to access for this purpose.

METHODS

Our team recognized the opportunity to create a streamlined, optimized workflow that addresses prolonged wait times, putting patients and providers more in control of their appointment times, improving wait times, and increasing the on-demand convenience of the telehealth experience. Tele-Untethered was a quality improvement (QI) pilot approved by the institutional review board (IRB) (IRB protocol #210364QI). The goal was to improve ambulatory care clinic flow, decrease reliance on a virtual waiting room, improve clinic throughput, and improve patient flexibility and satisfaction. The clinic process utilized 2 standard and approved techniques available at our institution (Doximity Video Dialer, and Epic MyChart Video Visits [MCVV]). The Tele-Untethered clinic combined optimal features of both virtual care platforms (the standardization of Epic eCheck-in for consent, questionnaire, financial attestation, and location declaration, as well as the flexibility of Doximity text-to-video link feature of notifying patients when their clinical care provider is ready to see them for their virtual visit). A clinic process flow was developed for this single, low-volume, tele-stroke provider's clinic to assess feasibility and signal of effectiveness. Standard work was disseminated to provider, staff, and schedulers, which included patient educational instructions, scripting for schedulers, templates, and procedures for documenting contact information and visit type on provider schedules.

Preparation for IRB submission and discussions regarding workflow with clinic leadership and Doximity occurred in March 2021. Standard work development, metric definition, and IRB approval occurred in April 2021. Implementation, onset of scheduling, and "go live" were in May 2021. The assessment stage (including analysis and report out) took place in September 2021.

During this offering period, there were 2 possible types of telemedicine: Patients were able to either opt into the "Tele-Untethered Telemedicine" pathway, where they were simply texted when the provider was ready to see them, or the "Standard Telemedicine" pathway, where they were expected to log into their visit at a precise time and wait in a virtual waiting room until the provider "arrived." Patients were introduced to the new "Tele-Untethered" clinic pathway and were informed that this would allow them to bypass the virtual waiting room, go about their daily business, and simply await a Doximity text page inviting them to a video visit session from the clinic provider, close to the assigned time of their visit. Patient instructions

detailing "A new kind of video visit experience: A new way to deliver care; focused on allowing you more freedom while waiting for your designated visit time" were sent to patients both by standard mail and via MyChart. The patient was then assigned a clinic time slot and notified that he or she did not need to log into a computer and wait in a "virtual waiting room." Patients simply provided cell phone numbers to receive Doximity text-to-video links when the provider was ready to see them. They were informed the provider would text them for their appointment close to the time of their appointment (likely no earlier than 60 minutes before and no later than 20 minutes after their scheduled appointment time slot). They were also informed that if the provider called them early, and they were unavailable, the provider would simply call back closer to the designated time. This allowed the patients flexibility of time and location and the ability to judge when to be available, but avoided patient concerns of potentially missing their appointment.

Upon scheduling, clinic staff reminded the patients to keep their cell phones close to them during this time window. Instructions were also given to patients regarding assuring their own privacy, since they we not tethered to a private desktop computer location. Finally, knowing that patients may not have flexibility, patients had the option to opt out and be given a "Standard Telemedicine" time slot. During the pilot period, best practices were developed, whereby Standard Telemedicine slots were given at the beginning of the clinic for those opting out. This allowed for more flexibility/time savings to be realized for the remaining stacked series of Tele-Untethered visits on that day. For a telemedicine schedule with standard time slots (Standard Telemedicine), patients were evaluated at standard times, with no time potentially freed up. For Tele-Untethered, patients were evaluated sequentially depending on when the prior visit was completed (Tele-Untethered Telemedicine), which allowed for time to be potentially freed up.

Patients were encouraged to use the MCVV eCheck-in process (including patient questionnaire, eCheck-in, online consent attestation, financial disclosure, acknowledgment of the notice of privacy practices, and the patient's declaration of intrastate location). If the patient did not have MyChart, these processes followed standard telehealth pathways and were addressed verbally by the provider upon initiation of the video portion of the visit. In all cases, the provider would text the patient's cell phone, using the Doximity text-to-video link messaging feature, when he or she was ready to begin the patient evaluation. The text-to-video link is a text message received by the patient that has a clickable link that takes the patient directly to a video window on the same device that the patient receives the text on. Upon completion of the visit, standard after-visit summary practices were followed (based on whether the patient had a MyChart account or not).

Collected metrics included baseline characteristics, general reason for clinic evaluation, visit volumes, visit rates, percentage of patients seen early or late, and

potential/actual time savings. Potential time savings included times where cases were completed early, but the provider could not move on to the next patient visit due to that next visit being a Standard Telemedicine type and not a Tele-Untethered type. For this pilot, we utilized the already -employed, UCSD -hospital -clinic -standard, National Research Center (NRC) survey questions, with focus on 4 standard questions: (1) Ability to talk to your care provider in a timely manner; (2) Likely to recommend this provider; (3) Method of connecting with the care provider was easy to use; and (4) Overall rating of the provider (0-10). These surveys are pushed electronically to patients seen in UCSD clinics and are used for quality analyses and process improvement purposes. Nothing was changed in this process for our Tele-Untethered program. These NRC surveys were reviewed, and Net Promotor Scores (NPSs) were collected.

RESULTS

From May 19, 2021, to July 28, 2021, 8 consecutive clinic sessions were included from one Vascular Neurology clinic physician provider. Over this 2.5-month period, 22 patients were scheduled for evaluation, with 73% (n = 16) opting in for the new "Tele-Untethered" experience and 27% (n = 6) opting for "Standard Telemedicine" time slots. Of those arriving for visits, 76% were Tele-Untethered and 24% were Standard Telemedicine. Because this was an initial experience, some of the patients may not have been contacted prior to the clinic appointment. These patients were included in the 6 total "Standard Telemedicine" visits. One "Standard Telemedicine" patient did not present for the appointment and was classified as "no-show." As the primary feature of Tele-Untethered is a text to the patient's mobile device when the provider is ready to begin the clinic appointment, the Doximity text-for-video link was utilized for 94% of all Tele-Untethered visits (6% used Doximity telephone-only). Of the 16 Tele-Untethered appointments, 56% (n = 9) used the verbal consent and check-in process with the Doximity video technique and 38% (n = 6) used the MCVV eConsent and eCheck-in process with Doximity video technique. Of the 5 Standard Telemedicine visit types, 20% (n = 1) used the verbal consent and check-in process with the Doximity video visit technique, while 80% (n = 4) used the standard MCVV eConsent and eCheck-in process with MCVV video technique. Fifty-five percent of all patients were seen prior to the scheduled clinic appointment time, and no patients were seen after the scheduled clinic appointment time. Cumulatively, there was a potential savings of 9 hours 41 minutes (1 hour 12 minutes per session) and actual savings of 7 hours 22 minutes (55 minutes per session).

Regarding patient demographics, as noted in Table 1, there were no differences in sex (52% male vs 48% female; $P = .86$). In the Tele-Untethered group, 63% were male ($P = .35$). In the Standard Telemedicine group, 20% were male ($P = .30$). There was no statistical difference in sex when comparing the Tele-Untethered and Standard Telemedicine groups ($P = .43$) although the group sizes are quite different. Average age was 64 years and showed no statistical difference between the Tele-Untethered and Standard Telemedicine groups (62 years vs 68 years; $P = .33$). Overall, 57% were White, 14% were Black, 10% were Asian, and 19% were other/multiracial. Nineteen percent were Hispanic. There were no differences in demographics in Tele-Untethered versus Standard Telemedicine for percentage of White (56% vs 60%; $P = .91$), percentage of non-White (44% vs 40%; $P = .92$), or percentage of Hispanic (19% vs 20%; $P = .98$). As noted, 67% were new visits (NVs) (69% Tele-Untethered vs 60% Standard Telemedicine; $P = .78$). Overall visit duration was 24 minutes (25 minutes for NVs and 23 minutes for return visits [RVs]). Visit duration showed differences between the 2 groups both overall (19 minutes for Tele-Untethered vs 39 minutes for Standard; $P = .005$) and for the NV type (19 minutes for Tele-Untethered vs 46 minutes for Standard Telemedicine; $P = .004$).

As noted in Table 2, Doximity Video Dialer was the most frequently used video technique (77% of all visits and 94% of the Tele-Untethered visits). Although the standard MCVV eCheck-in solution was encouraged, 62% of the Tele-Untethered and 52% of the visits overall still took place using a more flexible verbal check-in solution (requiring verbal consent over video, acknowledgment of notice of privacy practices, financial disclosure, and statement of intrastate location). One Tele-Untethered patient did not have Internet access, so the patient was evaluated by telephone only. Encounter duration averages were not affected when the single patient evaluated via telephone was included or excluded from analysis. Twenty-four percent of patients requested Standard Telemedicine time slot visits. Survey questions were reviewed for qualitative themes of satisfaction. Although NPSs were statistically unchanged (92% pre vs 100% during the pilot), given the limited initial experience and low numbers of surveys, meaningful conclusions cannot be drawn from the NPS for this pilot. Anecdotally, patients noted flexibility and satisfaction, stating significant benefit of not having to be near the computer and appreciating the ability to attend to other important tasks.

DISCUSSION

We noted that the majority of patients (76%) were interested in participating in the UCSD Tele-Untethered opportunity. This pilot benefited patients by allowing them flexibility to address other personal tasks instead of being tied to a "virtual waiting room." Tele-Untethered benefited providers by allowing them to: see patients in order but not tied to exact schedule times; improve throughput of cases; streamline team communications; and save time per clinic session.

Although ambulatory telemedicine evaluations are not new,[6] this Tele-Untethered telemedicine clinic workflow at UCSD is more novel. We found an average

Table 1. Demographics and Visit Information[a]

	Overall	Male	Female	P
Overall				
Total	21	52% (n = 11)	48% (n = 10)	.86
Tele-Untethered	16	63% (n = 10)	38% (n = 6)	.35
Standard Telemedicine	5	20% (n = 1)	80% (n = 4)	.30
		Tele-Untethered	**Standard Telemedicine**	
Visit information				
Visits	21	76% (n = 16)	24% (n = 5)	**.04**
NVs	67% (n = 14)	69% (n = 11)	60% (n = 3)	.78
RVs	33% (n = 7)	31% (n = 5)	40% (n = 2)	.83
Sex (male)	52% (n = 11)	63% (n = 10)	20% (n = 1)	.43
Sex (female)	48% (n = 10)	38% (n = 6)	80% (n = 4)	.21
Average age (range) (n)	64 y (31-81) (n = 21)	62 y (31-81) (n = 16)	68 y (62-75) (n = 5)	.33
Visit duration (average)				
Visit duration (all)	24 min (n = 21)	19 min (n = 16)	39 min (n = 5)	**.005**
Visit duration (NV)	25 min (n = 14)	19 min (n = 11)	46 min (n = 3)	**.004**
Visit duration (RV)	23 min (n = 7)	20 min (n = 5)	30 min (n = 2)	.43
Demographics				
% White	57% (n = 12)	56% (n = 9)	60% (n = 3)	.91
% Non-White (Black/Asian/other/multiracial)	43% (n = 9)	44% (n = 7)	40% (n = 2)	.92
% Black	14% (n = 3)	19% (n = 3)	0% (n = 0)	.75
% Asian	10% (n = 2)	0% (n = 0)	40% (n = 2)	.74
% Other/multiracial	19% (n = 4)	25% (n = 4)	0% (n = 0)	.56
% Hispanic	19% (n = 4)	19% (n = 3)	20% (n = 1)	.98

Abbreviations: NV, new visit; RV, return visit.
[a]Demographic and visit information for the overall pilot period. Information comparing sex is listed overall and for both Tele-Untethered and Standard Telemedicine visit modalities (top). Information comparing visit modalities as related to visit type, age, visit duration, and demographic variables for Tele-Untethered and Standard Telemedicine visit modalities is also presented (bottom).

Table 2. Visit Technique (Tele-Untethered vs Standard)[a]

Technique		Count	Overall	Per Technique
Tele-Untethered	Tele-Untethered—Verbal check-in—Doximity video visit	9	43%	56%
	Tele-Untethered—MCVV eCheck-in—Doximity video visit	6	29%	38%
	Tele-Untethered—Verbal check-in—Telephone visit	1	5%	6%
Standard Telemedicine	Standard—MCVV eCheck-in—MCVV visit	4	19%	80%
	Standard—Verbal check-in—Doximity video visit	1	5%	20%
	Standard—Verbal check-in—Telephone-only visit	0	0%	0%

Abbreviation: MCVV, MyChart Video Visit.
[a]Various possibilities for patient check-in and video visit technique: for Tele-Untethered (top) and Standard Telemedicine visit techniques (bottom). Check-in could be verbal or by MCVV. Visit could be by Doximity, MCVV, or telephone. Percentages overall are shown, as are percentages for both Tele-Untethered and Standard Telemedicine visit techniques. (*Note*: One patient in Tele-Untethered with MCVV eCheck-in also logged into an MCVV video session).

time -savings of 55 minutes per half-day session in this low-volume clinic. Although this degree of savings would not be expected in a higher-volume clinic setting, even small-to-modest time savings, coupled with an optimized workflow, would be worthwhile for providers and improve wait times for patients. Lessons learned in this experience focus on improvement toward optimal flow and use of Lean principles to optimize satisfaction.[1,7,8] Both developing entire sessions for just Tele-Untethered and stacking Standard Telemedicine patients first were best practices to help realize time savings for providers should they finish the prior patient early. The Figure shows 2 hypothetical schedules: the "Standard Telemedicine" schedule (top) results in patients being seen at set times, with no time potentially freed up, whether the provider can see them early or not. The "Tele-Untethered" schedule (bottom) stacks Standard Telemedicine visits first, for those patients needing set scheduling, and allows Tele-Untethered visits thereafter. This allows greater throughput, optimization of clinic session time, and improved flexibility so the patient is not tied to a virtual waiting room at a specific time. Interestingly, flexibility of the text-to-video technique was even noted in settings where patients were called early and not available. On one occasion, a patient who was not initially available to answer the phone later logged into the visit and the provider received a text link, which allowed him interval time to attend to other matters, and not be tied to a "blank screen" either.

Just as provider workflow optimization is critical, patients' time and experiences are as important. In today's environment, patients are more and more used to "on-demand" care. The experience of patients waiting for their providers in the waiting room is a strong driver of patient satisfaction.[5] This has expanded to the telemedicine arena with a desire for ease of use and improved communications.[9] However, waiting rooms have been replaced with the "blank screens" of virtual waiting rooms. We asked the question as to whether virtual waiting rooms were even necessary anymore. The desire for care more resembling "on-demand" encounters, and the desire to remove the concept of the waiting room, led to the development of UCSD Tele-Untethered.

Most patients opted into the more flexible Tele-Untethered option, highlighting the fact that many patients are clearly expecting flexibility and ease of use, even when seeking out medical care with their own providers. Flexibility is important, but some patients (be they busy professionals or others desiring more specificity related to managing their time) still want standard time slots to be designated. The Tele-Untethered operations still allow for this (with either designating full sessions of Standard visits or stacking Standard Telemedicine visits early in a clinic session).

This pilot was performed in a stroke clinic, where the population was older than in some clinics (average age was 64 years). However, with Tele-Untethered telemedicine, even busy patients in the workforce are free to be at work right up until time they receive the text message link. Tele-Untethered allows them to continue their productivity until they are called by their provider. Thus, Tele-Untethered should be potentially ideal for patients whether in retirement age or young and busy professionals.

In this low-volume clinic, 55% of patients were seen early and Tele-Untethered visits were of shorter duration than Standard Telemedicine visits. These findings may have been driven by the provider knowing he or she could move forward to the next patient whenever ready (and so clinical documentation was completed

Time Slot Assigned	NV/ RV	**Standard**	Version	Show/ No-Show	Patient Seen at	Visit Completed	Extra Time?	Time Potentially Freed Up	Time Actually Freed Up
8:00	NV	S	Standard MCVV	S	8:00	8:30	Y		
9:00	NV	S	Standard MCVV	S	9:00	9:40	Y		
10:00	NV	S	Standard MCVV	S	10:00	11:00	N		
11:00	RV	S	Standard MCVV	S	11:00	11:15	N		
11:30	RV	S	Standard MCVV	S	11:30	12:00	N		
								0:00	0:00

Time Slot Assigned		Tele-Untethered vs Standard	Version	Show/ No-Show	Patient Seen at	Visit Completed	Seen Early?	Time Potentially Freed Up	Time Actually Freed Up
	8:00								
	8:20								
8:00	9:05	(S)	Standard MCVV Visit	S	8:00	8:20	No		
9:00	9:50	TU	Tele-Untethered- Non-MCVV checkin- Doximity Video Visit	S	8:20	9:00	Early	0:05	
10:00	10:00	TU	Tele-Untethered- Non-MCVV checkin- Doximity Video Visit	S	9:05	9:40	Early	0:10	
11:00	RV	TU	Tele-Untethered- MCVV checkin- Doximity Video Visit	S	9:50	10:00	Early		
11:30	RV	TU	Tele-Untethered- MCVV checkin- Doximity Video Visit	S	10:00	10:10	Early		
								2:05	1:50

Figure. Schedule templates. Two hypothetical schedules: The standard schedule (top) features set times, The Tele-Untethered schedule (bottom) stacks standard "Standard Telemedicine" visits first for those patients needing set scheduling and allows Tele-Untethered "TU" visits thereafter. MCVV indicates MyChart Video Visit.

more quickly or done later). From the opposite view, if the next person could not be seen until a certain time slot (Standard visit), then there would be no reason to complete the visit and clinical documentation early. This finding could also be simply due to chance.

No patients were seen later than the scheduled time slot in this small group of patients. We hypothesize that larger gains in patient satisfaction would be more apparent in a busy clinic where patients are often seen late, since it is in these situations where usually the patient is waiting in a virtual waiting room for a provider. Not being tied to this waiting room while the provider runs late might be met with increased patient satisfaction. Similarly, removal of complex communication strategies designed to inform patients when providers are running late may also be of significant value. Our future analyses in busier clinics should assess satisfaction when patients are seen "later" than their scheduled appointment times without being tied to a virtual waiting room when that occurs.

Other questions still remain unanswered by this small pilot. Which specialties benefit most from this technique (and whether medical or surgical services have different experiences) should be assessed as some specialties may be more appropriate for telehealth use. Whether this somehow affects the Tele-Untethered experience remains to be seen in future cohorts. For the Tele-Untethered cohort, MCVV eCheck-in patients had a 14- to 19-minute longer average visit time than the verbal check-in pathway. Given small pilot size, and numerous variables involved, much larger analyses will be needed to determine any meaningful conclusions.

This Tele-Untethered pilot has limitations, owing to the small cohort size, which limited some conclusions. It is plausible that patients who are technologically more adept at utilizing electronic resources may be more willing to use the Tele-Untethered pathway and also more adept at navigating a telehealth encounter more efficiently. This may account for some duration differences between the 2 groups. This is being further addressed in larger cohorts. Lesser time savings for busier clinics would be predicted, though still of significance for providers. Whether or not time savings and satisfaction results would be realized in busier clinics, whether or not older or younger patients would be more or less inclined to participate, and whether different service lines would experience similar results should be assessed.[1] The standard work around inviting patients into this new way of providing telemedicine visits should be optimized.

As our initial UCSD Tele-Untethered successes included patient flexibility and time savings for both patients and clinic providers, this may serve as a model for busier clinics as the enterprise strives for optimal care, leaner processes, and improved patient satisfaction. We are expanding to many more clinics, including busy surgical clinics, to assess benefits in other scenarios. We suspect that providers may incorporate this into full "Tele-Untethered" clinic days, as well as portions of sessions "stacked" after either standard in-person visits or Standard Telemedicine visits. We are also assessing the option of extending Tele-Untethered to a "Just-In-Time" pathway for patients with long times until their scheduled appointments. Patients can opt into this pathway if they have greater flexibility and are willing to be seen on any of the provider clinic days (specifically for when other patients may not show or cancel at the last minute). This Just-In-Time Tele-Untethered may further improve provider throughput but, more importantly, may improve access, decrease wait times, and improve the experience for patients who have even more flexibility as to which days they can be virtually seen. We are working with the UCSD telehealth team, including technical, operational, scheduling, and ambulatory flow, to develop methods for adoption of numerous Tele-Untethered pathways across the enterprise, depending on future findings and results. As of now, owing to the deployment of the UCSD Tele-Untethered, our mantra is evolving more fully into the saying, "UCSD Tele-Untethered: Your provider can see you now."

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