Telehealth Increases Access to Brief Behavioral Interventions in Orofacial Pain Clinic during COVID-19 Pandemic: A Retrospective Study.

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Abstract

Objective Aim of the study was to test if orofacial pain patients were more likely to start and complete a brief psychological intervention for managing certain chronic orofacial pain conditions (physical self-regulation, PSR) via telehealth (during the COVID-19 pandemic) vs. in-person (prior to the COVID-19 pandemic). Exploratory aim was to describe demographic factors that may influence the patients to start and complete PSR.

Methods Retrospective medical charts of all patients seen at a university-affiliated tertiary orofacial pain clinic between July–December 2019 (in person, pre-pandemic) and July–December 2020 (telehealth, during pandemic) were reviewed. Charts were examined for demographic information and to compare the number of patients who started and completed PSR during each study period (chi-squared test).

Results Of 248 new patients seen in the clinic during 2019 period, 25 started PSR in-person (10.08%). Of 252 new patients seen during 2020 period, 53 started PSR via telehealth (21.03%). Patients were more likely to start PSR (OR=6.21, $p<.001$, CI=2.499 to 15.435) and more likely to complete all three sessions of PSR (OR=5.69, $p<.001$, CI= 2.352 to 13.794) when it was offered via telehealth than in-person. Among those who started PSR via telehealth, patients from metropolitan areas were more likely to start the intervention than those from non-metropolitan areas ($p=.045$).

Conclusions Offering brief psychological pain interventions via telehealth in tertiary orofacial pain clinics has demonstrated feasibility and may improve willingness to participate in psychological treatments. Results need to be replicated with prospective data as modality was confounded with pandemic in the current study.

Key Words: telehealth, brief behavioral intervention, orofacial pain, remote treatment, COVID-19 pandemic

Introduction

The COVID-19 pandemic has dramatically affected the healthcare system worldwide (1,2), presenting the challenge of providing high quality healthcare while also maintaining social distancing, managing prolonged waiting times in the clinics, and controlling the risk of disease transmission (3). Out of necessity, telehealth was adopted by many medical centers to minimize in-person visits (4,5). The effectiveness of telehealth was reported to be comparable to standard practice in several healthcare settings (6,7), specifically for interventions that do not require a clinical examination or hands-on procedure (8,9). Telehealth offers unique opportunities for delivering psychological interventions for patients with chronic orofacial pain in tertiary orofacial pain clinics, especially because these patients often experience pain, poor sleep (10), intense fatigue (11,12), and comorbid depression (13), which along with long distance drives, makes attending in-person appointments challenging (14-16). Due to the novelty of telehealth recently implemented as a treatment modality, no study to date has examined whether telehealth increases willingness to engage in treatment for psychological interventions in tertiary orofacial pain care.

One specific psychological intervention for orofacial pain is Physical Self-Regulation (PSR). PSR involves training in breathing, postural relaxation, and proprioceptive re-education. PSR has demonstrated to improve pain when in combination with standard dental care, and has been the standard psychological intervention for chronic masticatory myofascial pain patients at our orofacial pain clinic for the last two decades (16). In May 2020, our clinic began offering PSR over telehealth to maintain continuity of care due to the COVID-19 pandemic. The aim of the current study was to retrospectively examine if offering PSR via telehealth (vs. in-person) resulted in willingness to perform psychological interventions in a tertiary orofacial pain clinic. Specifically, we sought to 1) test whether more patients were willing to *start* PSR if it was offered via telehealth vs. in-person, and 2) test whether patients were more likely to *complete* PSR if it was offered via telehealth vs. in-person. It was

hypothesized that orofacial pain patients would be more likely to start and complete PSR if it was offered via telehealth. An exploratory third aim was to examine demographic factors (age, gender, urbanization status) that may predict whether patients chose to start or complete PSR when offered via telehealth.

This is the first study to our knowledge to directly compare patients' willingness to start and complete a brief psychological intervention via telehealth vs. in-person in a tertiary orofacial pain setting. Although data should be interpreted cautiously because all the telehealth visits were provided during the pandemic whereas all the in-person visits were held prior to the pandemic, if it is found that telehealth improves psychological intervention start or completion rate, it may have implications for improving care in multidisciplinary orofacial pain settings.

Methods

Procedures

At their initial appointment at the orofacial pain clinic, patients completed pain questionnaires as part of their routine clinical care. After a detailed interview and a clinical examination of craniofacial structures, orofacial pain diagnoses were determined. When the diagnosis was consistent with muscle pain (*i.e.*, local myalgia, myofascial pain, centrally mediated myalgia) and the clinician considered PSR as beneficial for the patient, they were referred to be evaluated by the psychology team. During the 2019 study period (*i.e.*, in-person), the psychology team was in the clinic three days a week, where PSR was introduced to patients during their initial appointment, followed by three subsequent sessions to complete the intervention if interested. During the 2020 study period (*i.e.*, telehealth), potential PSR patients were scheduled for an initial evaluation via telehealth on one of three weekdays, during which PSR was introduced and three subsequent telehealth visits were scheduled to

complete the intervention. Thus, the total amount of time that the behavioral team was in the clinic (either in-person or virtually) was equivalent during both study periods (*i.e.*, three days a week).

Data extraction. The current study consisted of a retrospective review of all the medical charts from new patients seen during the two study periods. Data extraction was done by two independent reviewers (L.S., D.FV.) and disagreements were resolved via discussion with a third reviewer (I.B., I.MH.). Age, gender, zip code (used to code urbanization as described below), modality of intervention (in-person vs. telehealth), and number of PSR sessions completed were extracted. This study was approved by the Institutional Review Board of the Office Research Integrity at the university in which it was conducted (IRB# 54563).

Intervention. PSR has been used in our clinic for over 20 years, and evidence finds that it is effective for improving pain outcomes in patients with chronic pain above and beyond standard dental care alone (16). Session 1 consists of discussing clenching awareness and reviewing strategies for monitoring parafunctional habits. Patients are then introduced to four stretching exercises to relax the masseters, neck, upper back, and full body, respectively, and practice those exercises in the session. These exercises were designed to reduce muscle activity of the trigeminally-mediated region. Patients are assigned homework of practicing each exercise 5x/day until the next session (unless the exercises increase pain, in which case they are told to discontinue the exercises which cause pain), resulting in 15-30 min of practice/day. Session 2 consists of reviewing the homework and exercises from session 1, followed by an introduction to, and practice of, diaphragmatic breathing which is intended to increase parasympathetic tone and decrease sympathetic tone. Patients are told to practice diaphragmatic breathing for two sessions of 15 min per day (*i.e.*, 30 min/day total). Session 3 consists of checking in on homework, answering any remaining questions, and providing additional treatment planning as needed. A full description of the PSR protocol is provided elsewhere (16). Table 1 presents an overview of the intervention.

Participants

Electronic medical charts of all new patients seeking an initial consultation at Orofacial Pain Center between July 1–December 18, 2019 and July 1–December 18, 2020 were examined. Inclusion criteria for having data extracted were: (a)patients evaluated by the psychology team for PSR intervention during the aforementioned study period and (b)consented for their data to be used for research. Participants were excluded if they (a)were treated by psychology for reasons other than PSR, or (b)had future PSR appointments scheduled outside the study period.

Data from 176 electronic medical charts were reviewed for eligibility. Records of 59 patients were eliminated because they did not meet the inclusion criteria (14 with different treatments; 45 with PSR appointments scheduled outside the study period). Thus, the clinical records of 117 patients were selected.

Materials

Demographics. At the initial visit, patients self-reported their age, gender, address, pain history. Gender was coded as dichotomic (0=male,1=female), age as continuous variable.

Diagnosis. Only the primary orofacial diagnosis based on AAOP classification was considered and used for descriptive purposes.

Urbanization. Urbanization level was considered only for patients inside the state of Kentucky, and coded according to 2013 U.S. Department of Agriculture Rural-Urban Continuum Codes (RUCC_2-13, 12/10/2020) (17). Zip codes were coded as 0=Metropolitan area (RUCC_2013 1-3); 1=Non-Metropolitan urban and completely rural areas (RUCC_2013 4-9). Non-metropolitan urban and rural areas were combined into one category due to small sample size.

Total Number of Patients Seen in Clinic. To test the primary aim, total number of new patients seen in the clinic was calculated during each study period.

Number of Patients Evaluated for PSR. Number of patients evaluated for PSR treatment was obtained by counting all patients with a first evaluation for PSR. The modality was dichotomized using the code 0=in-person and 1=telehealth. The variable was dichotomized using the code 0=not evaluated and 1=evaluated.

Number of Patients Starting and Completing PSR Treatment. Number of patients starting PSR treatment was obtained by counting all patients who had a first PSR session. The modality was dichotomized using the code 0=in-person and 1=telehealth. The number of patients starting and/or completing treatment was obtained by counting the number of patients who finished at least one PSR session and/or all three PSR sessions, respectively. The variable was dichotomized using the code 0=PSR not started and 1=PSR started, and the code 0=PSR not completed and 1=PSR completed.

Data Analysis

Means, standard deviations, ranges, and percentages were computed for all study variables as appropriate. To examine patient characteristics, t-test was used to compare age, chi-square test to compare urbanization status and gender between in-person and telehealth groups.

To test the first and second hypothesis, that the total number of patients starting or completing treatment was different between in-person and telehealth groups, we completed descriptive statistics at each stage of PSR treatment. Specifically, we first calculated the total number of new patients seen during each study period; next, the percentage of new patients evaluated for PSR for each study period; finally, the percentage of the patients who actually started PSR, and of those, the number who completed PSR for each study period. This approach allowed to adjust for the fact that both study periods had different total number of patients coming into the clinic and referred for PSR. To formally test the hypothesis that treatment modality influenced the likelihood of patients starting or completing treatment, we used a logistic regression approach, with modality as independent variable (coded 0/1) and PSR start as dependent variable (coded 0/1; Aim 1). Age, gender, state of residence were included in the model as covariates. A similar model was run with the dependent variable of PSR completion (coded 0/1; Aim 2).

To test the third exploratory aim, the analysis was computed only on the telehealth group (*i.e.,* 2020 period). We first compared the group of patients who received a first evaluation

but chose not to start PSR treatment with the group of patients who received a first evaluation and started PSR treatment. This allowed us to examine demographic factors predicting who actually started PSR or not. Next, of all patients who started PSR via telehealth, we compared the group who completed PSR vs. those who did not. T-test was used to compare the groups in age, chi-square test was used for gender and urbanization status.

p value was set at <0.05. Data were analyzed with SPSS (IBM SPSS Statistics Macintosh, Version 27.000, IBM Corp, Armonk,NY).

Results

A total of 78 patients (67 females) started PSR treatment across both study periods, with local myalgia being the most common primary diagnosis (47.43%). Mean age was 40 years ± 16.92 (Table 2), with the 2019 (in-person) group significantly older (mean 45.40 ± 18.46) compared to the 2020 (telehealth) group (mean 37.45 ± 15.69, $p = .052$), but similar in regard to gender ($p = .741$). Among KY residents, both modality groups showed similar metropolitan and non-metropolitan distribution (Table 3).

Aims 1 and 2: Number of patients starting and completing PSR treatment

Of the 248 patients evaluated in 2019, 53 were referred for a psychological evaluation for PSR treatment (21.37%). Of those, 25 started PSR in person (47.17%) and of those, 14 individuals (56.00%) completed the treatment. Conversely, of the 252 patients seen in 2020, 64 were referred for a psychological evaluation for PSR treatment (25.40%). Of those, 53 started PSR via telehealth (82.81%) and of those, 40 (75.47%) completed the treatment (Figure 1).

Logistic regression revealed that, when compared to in-person, telehealth modality was significantly associated with the likelihood of starting (df(1)=1.826, SE=.464, Wald=15.459, *p*

< .0001, OR=6.21, 95% CI = 2.499 - 15.435) and finishing PSR (df(1)=1.740, SE=.451, Wald=14.862, OR = 5.69, p < .0001, 95% CI = 2.352 - 13.794). Age, gender, state of residence were not significant predictors of the likelihood of starting or finishing PSR (p > .05).

Aim 3: Description of the group who was offered telehealth intervention

In the telehealth group, the third aim was to compare demographic factors between those who started vs. those who did *not* start PSR; additionally, to compare those who completed vs. those who did *not* complete PSR.

As stated above, of the 64 patients evaluated for PSR via telehealth, 53 (82.81%) started PSR and 11 (17.19%) did not. The two groups did not differ with regard to gender percentage ($\chi^2(1)=1.606$, p = .20, 95% CI = -13.516 - 24.843). Those who did not start PSR were marginally younger than those who did (28.54 ± 16.40 vs. 37.54 ± 15.69, respectively, p = .094). Patients who started PSR were more likely to be from metropolitan areas than those who did not (80.43% vs. 50.00%, respectively, p = .045) (Table 3).

Among the 53 individuals who started PSR via telehealth, 40 completed the treatment (75.46%) and 13 (24.52%) did not. The two groups did not differ with regard to gender ($\chi^2(1)=0.449$, p = .503, 95% CI= -19.513 - 22.736), age (38.03 ± 16.88 vs. 35.69 ± 11.66, respectively, p = .645), and urbanization status (33.33% vs. 16.21% from metropolitan areas, respectively, $\chi^2(1)=1.319$, p = .250, 95% CI= -8.864 – 49.519) (Table 3).

Discussion

During 2020, telehealth has been by necessity one of the most widespread responses of the medical field to the COVID-19 pandemic (18). Our tertiary orofacial pain clinic decided to offer psychological services via telehealth to provide continuity of care while minimizing risk of exposure. Indeed, psychological services adapted well to offer services online, as quality

of care was found not to be reduced by this modality (19). This is supported by a systematic review by Shigekawa et al., who demonstrated the equivalence of remote and in-person assessment especially for psychiatric conditions (8). Yet, no study to date has tested the feasibility of offering brief psychological interventions in a tertiary orofacial pain setting via telehealth. The overall goals of this preliminary archival study were to empirically examine if orofacial pain patients were more likely to access and complete brief psychological treatments if they were offered via telehealth as opposed to in-person.

The first two aims of this study were to investigate if more patients were willing to start and finish the treatment when offered via telehealth. Despite the fact that the number of total patients seen in the clinic in 2019 (in-person) vs. 2020 (telehealth) were similar (248 vs. 252, respectively), as were the patients evaluated for PSR (53 in-person vs. 64 via telehealth), we found that the number of patients who started PSR was twice as high when it was administered via telehealth (53 via telehealth vs. 25 in-person). Our study revealed that telehealth modality was a significant predictor of the likelihood of starting and completing PSR, with a robust odds ratio of 6.21 and 5.69, respectively. These findings suggest patients' satisfaction and willingness to adhere to telehealth psychological interventions. A wide body of literature reveals that the efficacy of psychological telehealth interventions is greater than or equal to in-person modality (9, 20-24), especially in interventions combining cognitive and physical approaches (*i.e.*, PSR), with a moderate effect favoring telehealth (p = .031, 95% CI= 0.046 - 0.955) (9).

The advantages of telehealth services are several. From patients' standpoint, it may eliminate waiting time in the clinic, reduce the burden of long-distance drives (25) and associated costs (26). From a healthcare standpoint, it may increase access to care (20, 27), improve the quality of life of remote underserved populations (28), overcome geographic barriers (29), and reduce the use of resources in health centers (30).

The fact that patients demonstrated a higher predisposition to complete the treatment via telehealth may be interpreted as telehealth being a valid therapeutic routinely tool, and not only as emergency during a pandemic (6, 31). Our third aim was to evaluate the

demographic features of the patients who did not start or complete the treatment when offered via telehealth. Age and gender did not differ between the individuals who did not start the treatment and the individuals who started the treatment. Interestingly, the group of subjects who did not start the treatment had a greater proportion of patients coming from non-metropolitan areas (50% vs. 19.57%, respectively). Similarly, the percentage of individuals coming from non-metropolitan areas who did not complete the treatment was found to be twice the percentage of individuals from metropolitan areas who complete the treatment (33.33% vs. 16.21%). This might suggest a disparity in the access to technology and connectivity of the less urbanized areas, as confirmed by studies worldwide (32-34). It is important to understand if these patients do not get access to treatment because of lack of familiarity with the technology or lack of remote connection (35), all factors that can further increase the disparity in access to healthcare. Given that patients from non-metropolitan areas are more likely to have chronic pain and less likely to have access to chronic pain treatments (36), future research identifying the barriers that prevent non-metropolitan patients from accessing brief telehealth interventions for pain is critically needed.

Considering the importance of telehealth nowadays, it is beneficial to identify elements that may help in the acceptance of this modality of intervention. Previous studies have considered telehealth positively (37), especially when supported by the direct social environment, including families and friends (38). The most important predictor of the acceptance of telehealth among the patients is its perceived usefulness (38), achieved when telemedicine adoption improves either quality of life or perceived ease of use (38). Moreover, the medical and psychological fields are well aware of how expectations can influence the perception and the outcome of a treatment (39). Other important individuals' traits in the uptake of telehealth include the search of social support (40) and social influences (41), especially in patients living alone.

Limitations

Certain methodological limitations of the study should be mentioned. First, the participants could not be randomly assigned to the modality of treatment, as telehealth was implemented as a necessary therapeutic tool to face a pandemic. This introduces a significant confound factor to the study: all the telehealth visits were offered during the pandemic, whereas all the in-person visits were offered pre-pandemic. Other possible variables that may have contributed to increased acceptance of telehealth treatment during the pandemic may include greater opportunity (people may have been working less or remotely during the pandemic), greater perceived need at a time of high stress, and increased fear of being in a public space, among others. Because of these potential confounding factors, future work needs to test whether prospectively randomly assigning participants to telehealth vs. in-person will result in similar preference and acceptability of telehealth.

A second limitation is the small sample size of patients receiving the in-person intervention (n = 25). This might be partly due to the fact that many patients were not willing or able to drive to the clinic three times, and as such, may have chosen not to start the treatment. This could also be explained by the fact that when the intervention was conducted in-person, the psychology team was present on Tuesday, Thursday and Friday. Patients with an initial appointment on Mondays and Wednesdays would therefore not have been able to receive an initial psychological evaluation on the same date of their initial visit. During the telehealth period, the psychology team was present on those three days; however, because the initial psychology evaluations were always scheduled as a stand-alone visit (*i.e.*, not on the date of the initial clinic visit), all patients were equally able to access the intervention. This represents a significant advantage of telehealth: the amount of time “in clinic” is equivalent, however possibility to access to care is improved by removing the constraint of being physically in the same location of the patients.

A third limitation is that this study was applied on a precise intervention (PSR). Considering that not all therapeutic approaches can be easily applied remotely, especially the ones that require physical assessment, the present results cannot be generalized to each intervention

(8). For these reasons, these findings should be interpreted as preliminary and need to be replicated with randomized clinical trial design.

The current study has also significant strengths. It is the first to directly examine the feature of implementing a brief psychological telehealth intervention for pain in a tertiary orofacial pain clinic.

Conclusions

The results are encouraging and tentatively suggest that offering telehealth as modality of treatment can improve the delivery of brief behavioral interventions as integral part of multidisciplinary orofacial pain care. Given the shortage of specialized orofacial pain providers across the country and the high prevalence of orofacial pain conditions, it is recommended that orofacial pain clinics consider the possibility of introducing telehealth modalities as part of their standard care. Further prospective studies that confirm the present results are needed, as telehealth modality was confounded with the current pandemic.

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Figure legends

Figure 1. Graphical Representation of Number of Patients Completing Each PSR Stage by Modality.

Table 1 Overview of PSR intervention.

Physical Self-Regulation
SESSION 1
Discuss clenching awareness and review strategies for managing parafunctional habits
Provide rationale for and practice lips, teeth, and tongue exercise to relax masseters and related structures of mastication
Provide rationale for and practice full body relaxation exercise
Provide rationale for and practice neck relaxation exercise
Provide rationale for and practice upper back relaxation exercise
SESSION 2
Review changes in pain, homework, and exercises from last session
Introduce rational for and practice diaphragmatic breathing
SESSION 3
Review changes in pain, homework, and exercises from last session
Answer remaining questions and discuss treatment plan (i.e., provide additional referrals, discuss additional strategies for managing pain, etc.)

Table 2 Demographic data of the 78 subjects who started PSR treatment and comparison between the two groups (in-person vs. telehealth intervention).

	Tot. N	**PSR In-person (Jul – Dec 2019)**	**PSR Telehealth Jul – Dec 2020)**	***p* value[1]**
Gender (%)				
Male	11 (14.10)	4 (16.00)	7(13.20)	.742
Female	67 (85.89)	21 (84.00)	46 (86.79)	
Age (y), mean ± SD	40 ± 16.92	45.40 ± 18.46	37.45 ± 15.69	.052
Urbanization Status[2]				
Metropolitan (%)	51 (79.69)	14 (77.77)	37 (80.43)	.813
Non-metropolitan (%)	13 (20.31)	4 (22.23)	9 (19.57)	
Patients seen in the clinic (n)	500	248	252	
Patients evaluated for PSR (% of previous row)	78	53 (21.37)	64 (25.39)	.289
Patients who started PSR (% of previous row)	54	25 (47.17)	53 (82.81)	<.001
Patients who finished PSR (% of previous row)		14 (56.00)	40 (75.47)	.084

[1] *p*-values were obtained from a chi-square test for gender and urbanizations status variable, from an independent sample t-test for age, and from a chi-square proportion calculator for % of patients evaluated, starting and completing PSR (https://www.medcalc.org/calc/comparison_of_proportions.php).

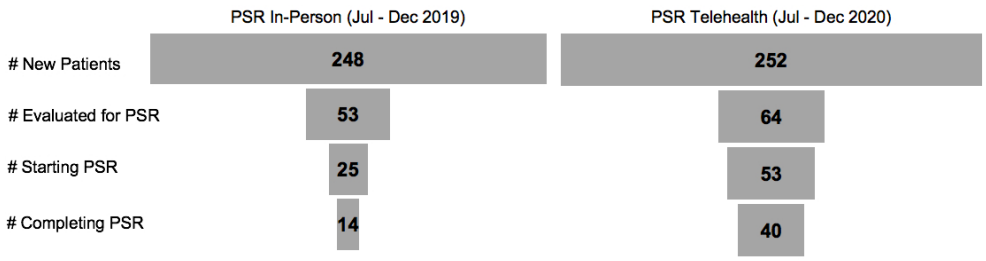
[2]Only includes KY residents (n = 64)

Table 3 Comparison of Patients who Started (vs. not Started) and Completed (vs. Not Completed) PSR via Telehealth.

	Patients who started PSR treatment	**Patients who did not start PSR treatment**	***p* value[1]**
Sample (%)	53 (82.81)	11 (17.19)	
Gender (%)			
Male	7 (13.21)	0 (0.00)	.205
Female	46 (86.79)	11 (100.00)	
Age (y), mean ± SD	37.54 ± 15.69	28.54 ± 16.40	.094
Urbanization Status[2]	n = 46	n = 10	
Metropolitan (%)	37 (80.43)	5 (50.00)	.045
Non-metropolitan (%)	9 (19.57)	5 (50.00)	
	PSR treatment completed	**PSR treatment not completed**	***p* value[1]**
Sample (%)	40 (75.46)	13 (24.52)	
Gender (%)			
Male	6 (15.00)	1 (7.69)	.503
Female	34 (85.00)	12 (92.31)	
Age (y), mean ± SD	38.03 ± 16.88	35.69 ± 11.66	.645
Urbanization Status[3]	n = 37	n = 9	
Metropolitan (%)	31 (83.79)	6 (66.67)	.250
Non-metropolitan (%)	6 (16.21)	3 (33.33)	

[1]*p*-value were obtained from a chi-square test for gender and urbanization status, from an independent sample t-test for age.

[2]Only includes KY residents (n = 56); [3]Only includes KY residents (n = 46)



Graphical Representation of Number of Patients Completing Each PSR Stage by Modality.

398x106mm (72 x 72 DPI)