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A. Grey Literature

1. **A guide to Managing iPads for Speech and Language Therapy**

Adapted for the CIT CEN toolkit by Steve Naylor for the Computers In Therapy Clinical Excellence Network (CIT CEN), 2021.
"This guide is an adaptation of an original document produced by Kathy Cann for the County Durham and Darlington Foundation Trust (CDDFT) – dated 4th September 2017. Please reference this document and CDDFT as appropriate when used elsewhere."

See the CIT CEN (Computers In Therapy Clinical Excellence Network) website for more tools:
https://toolkit.citcen.org/about/

B. Systematic Reviews

1. **A Systematic Review of Adherence Strategies for Adult Populations in Speech-Language Pathology Treatment**

Bartlett Rebecca S., Carpenter Alicia M., Chapman Leia K. American Journal of Speech-Language Pathology, 2022
Purpose: Speech-language pathologists (SLPs) often advise adult patients to complete at-home programs in order to improve outcomes. Despite this widespread practice, relatively little is known about treatment adherence. The purposes of this systematic review were to identify adherence strategies and adherence tracking methods used by adult populations that are commonly treated by SLPs (i.e., dysphagia, aphasia, traumatic brain injury, dysphonia, dysarthria), and to identify the efficacy of these strategies. Method: The systematic review was conducted in accordance with A Measurement Tool to Assess Systematic Reviews guidelines. A comprehensive literature search was performed in three databases (CINAHL, PubMed, and Web of Science). Results: Of the 679 articles found, 18 were selected for analysis. Two thirds of the included articles received the second highest rating on the 5-point JAMA Quality Rating Scheme. Interventions designed to alter treatment adherence included (most to least frequent) computer programs, portable devices/phone apps, alarm reminders, instructional DVDs, check-ins from a clinician/volunteer, and wearable device. Adherence reporting methods included (most to least frequent) self-report diaries, computer program/app-aided collection, wearable device, and clinician/volunteer observation. Of the articles that reported practice frequency, 58% found that adherence strategies improved practice frequency as compared to control. Of the articles that reported treatment outcomes, 66% found that adherence strategies were associated with improved treatment outcomes as compared to control. Conclusions: The paucity of publications reviewed suggests that treatment adherence

is considerably understudied in speech-language pathology. A clearer understanding of how to improve the design of adherence strategies could yield highly valuable clinical outcomes.
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2. **A scoping review of literature using speech recognition technologies by individuals with disabilities in multiple contexts**
Berner K., Alves A. N. Disability and Rehabilitation: Assistive Technology, 2021
Purpose: Speech recognition technology (SRT) is increasingly available and may provide opportunities for individuals with disabilities to participate in necessary activities and meaningful occupations. This inquiry methodically collects and reports on research related to SRT for individuals with disabilities and impairments. Material(s) and Method(s): Using the Arksey and O'Malley framework and PRISMA guidelines, five databases were queried and indexes of 11 journals were hand-searched for relevant articles. Articles were included if they were published after 2005, involved SRT, written in English, and participants(s) had a disability. Articles were charted, categorised for level of evidence, and findings were summarised. Result(s) and Conclusion(s): Of the 78 articles that were retrieved, 13 met inclusion criteria and were organised into 4 categories: SRT in primary and secondary education, in post-secondary education, for daily living, and without a specified context. No included articles considered SRT in vocational contexts. It was determined that SRT is a tool that may improve participation and independence of individuals with disabilities in multiple contexts. Most studies reviewed were non-empirical. Opportunities exist for providers to continue to develop a rigorous body of knowledge for the use of SRT to meet educational, vocational and daily living needs.IMPLICATIONS FOR REHABILITATION Speech recognition technology (SRT) provides a method of access that is widely available in mainstream technology devices such as personal computers, smartphones and mobile devices, and smart speakers/daily living aids. SRT may improve participation and independence of individuals with disabilities in contexts such as primary and secondary education, post-secondary education, and with independent living tasks. Many studies examining SRT are non-empirical, and there is an opportunity for assistive technology professionals and other providers who use assistive technology to continue to develop a rigorous body of knowledge. Copyright © 2021 Informa UK Limited, trading as Taylor & Francis Group.
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3. **Innovative technology-based interventions in aphasia rehabilitation: a systematic review**
Repetto C., Paolillo M. P., Tuena C., Bellinzona F., Riva G. Aphasiology, 2021
Background: In the last decades technologies have started to be integrated into language rehabilitation, but more recently many innovations have been included in the health field, especially the use of virtual reality (VR) and mobile devices. Aim(s): The present review aims to investigate the use and efficacy of innovative technology-based interventions for language rehabilitation in post-stroke patients. We consider innovative technologies as those implementing either virtual reality or mobile software applications. Method(s): For conducting this systematic review, we conformed to the PRISMA guidelines. The articles were selected by computer-based searches in three high-profile databases: PubMed, PsycINFO, and Web of Science. 13 studies met the inclusion criteria. Studies were also rated along the efficacy-effectiveness spectrum (RITES). Main Contribution: Most of studies used a tablet to deliver the therapy, and only a few of them implemented VR-based treatments. Despite the paucity of literature, the results were encouraging, and showed efficacy and effectiveness of rehabilitation programs based on innovative technologies. Moreover, patients appeared compliant to treatments. Conclusion(s): In future studies, more robust research designs should be implemented with larger sample sizes, more homogenous samples, and comparisons with "treatment-as-usual" control conditions. Finally, we suggest an innovative use of VR for language rehabilitation within an embodied cognition approach.Copyright © 2020 Informa UK Limited, trading as Taylor & Francis Group.
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4. **[Scoping review of the effectiveness of screen-to-screen-therapy compared to face-to-face-therapy on naming performance for patients with aphasia]**
Cordes Lara, Loukanova Svetla, Forstner Johanna. Zeitschrift fur Evidenz Fortbildung und Qualitat im Gesundheitswesen, 2020
INTRODUCTION: About 35,000 people in Germany suffered from stroke-related aphasia in 2019. One of the most frequent manifestations of aphasia are word finding disorders. In times of the COVID-19 pandemic, the temporary approval of video therapy enables the maintenance of speech therapy treatment. This leads to the necessity to investigate the effectiveness of screen-to-screen therapy via a video conferencing system

compared to conventional face-to-face therapy of adult aphasia patients., METHODS: For this scoping review, a literature search in the databases Cochrane, Pubmed and Web of Science was conducted for the period February 2010 to 2020. We included German- and English-language studies comparing the effectiveness of a classic face-to-face therapy with a screen-to-screen therapy of adults with aphasia. The studies were selected using the PRISMA flowchart., RESULTS: A total of five studies were identified. Both face-to-face therapy and screen-to-screen therapy showed significant improvements in naming performance in an Italian crossover study, a Canadian randomized study and a quasi-randomized study conducted in the UK. No improvements were found for both forms of intervention in an Israeli crossover study. In a German comparative study, significant improvements in naming performance were found for face-to-face therapy, but the results did not differ significantly from the screen-to-screen therapy intervention group., DISCUSSION: In all included studies, screen-to-screen therapy and face-to-face therapy had a comparable effectiveness on naming performance. The results demonstrate the feasibility of a screen-to-screen therapy under everyday conditions. However, it is possible that this form of therapy cannot always be implemented. Barriers to screen-to-screen therapy can be the use of technologies and restrictions in the visual field due to a neglect. One limitation of the scoping review was that only the naming performance was considered as an outcome, another was the small number of studies included., CONCLUSION: For many patients screen-to-screen therapy is currently the only possibility to receive speech therapy treatment. Therefore it is a positive aspect that screen-to-screen therapy is as effective as face-to-face therapy. Screen-to-screen therapy can provide expanded access to health care and professional expertise in health services. In this way, speech therapy care during the COVID-19 pandemic can be largely maintained. Further research is needed on evidence-based treatment methods and user-oriented apps for video therapy. Copyright © 2020. Published by Elsevier GmbH.
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C. Original Research

1. **Comparison of In-Person and Online Recordings in the Clinical Teleassessment of Speech Production: A Pilot Study**
Python Grégoire, Demierre Cyrielle, Bourqui Marion, Bourbon Angelina, Chardenon Estelle, Trouville Roland, Laganaro Marina, Fougeron C.écile. 2023
In certain circumstances, speech and language therapy is proposed in telepractice as a practical alternative to in-person services. However, little is known about the minimum quality requirements of recordings in the teleassessment of motor speech disorders (MSD) utilizing validated tools. The aim here is to examine the comparability of offline analyses based on speech samples acquired from three sources: (1) in-person recordings with high quality material, serving as the baseline/gold standard; (2) in-person recordings with standard equipment; (3) online recordings from videoconferencing. Speech samples were recorded simultaneously from these three sources in fifteen neurotypical speakers performing a screening battery of MSD and analyzed by three speech and language therapists. Intersource and interrater agreements were estimated with intraclass correlation coefficients on seventeen perceptual and acoustic parameters. While the interrater agreement was excellent for most speech parameters, especially on high quality in-person recordings, it decreased in online recordings. The intersource agreement was excellent for speech rate and mean fundamental frequency measures when comparing high quality in-person recordings to the other conditions. The intersource agreement was poor for voice parameters, but also for perceptual measures of intelligibility and articulation. Clinicians who plan to teleassess MSD should adapt their recording setting to the parameters they want to reliably interpret.
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2. **Telerehab at Home: Mobile Tablet Technology for Patients With Poststroke Communication Deficits- A Pilot Feasibility Randomized Control Trial**
Mallet K. H., Shamloul R. M., Lecompte-Collin J., Winkel J., Donnelly B., Dowlatshahi D. 2023
Purpose: Poststroke communication deficits (PSCD) are common following stroke. Early and intensive speech and language therapy is recommended to maximize outcomes. We wanted to test the feasibility of providing telerehabilitation for patients with PSCD using mobile tablet-based technology to bridge the gap between acute stroke care and outpatient speech-language therapy (SLT) services. Method(s): This was a prospective, randomized, open-label, blinded end-point design. Patients were randomized to either the

treatment arm (mobile tablet) or the control arm (standard of care). The study duration was either 8 weeks or when the patient was called to start outpatient SLT services, whichever occurred first. The primary outcome was feasibility, while secondary objective was to assess patient engagement and to explore improvement in communication ability. Result(s): We had a 38% recruitment rate, with a 100% retention rate for the treatment arm and a 50% retention rate for the control arm. Fifty percent of patients in the treatment arm adhered to the recommended 1 hr per day, whereas none of the control arm did. Patients were engaged in using the mobile tablet and feedback on the protocol was positive. Conclusion(s): SLT using telerehabilitation via mobile technology is feasible in the very early stages of acute stroke recovery. It is potentially an effective means of bridging the gap between discharge from the acute care setting to the start of outpatient SLT services. Our study supported proceeding to a clinical trial to assess efficacy of the intervention. Supplemental Material: https://doi.org/10.23641/asha.21844569. Copyright © 2023 American Speech-Language-Hearing Association.

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3. **Use and Perceived Effectiveness of Communication Modes Reported by Persons With Primary Progressive Aphasia**

Mooney Aimee R., Bravo Megan, Roberts Angela, Salley Elizabeth, Blaze Erin, Esparza Marissa, Fried-Oken Melanie, Khayum Becky, Rao Leela, Rademaker Alfred, Rogalski Emily. 2023

PURPOSE: Primary progressive aphasia (PPA) is a clinical neurodegenerative dementia syndrome characterized by early, selective, and progressive language impairment. PPA onset is gradual, providing time to potentially identify additional or alternative expressive communication modes; however, reports of communication mode use and effectiveness by persons with PPA have not been described. This study characterized the use, frequency, and perceived effectiveness of communication modes reported by individuals with PPA., METHOD: Forty-one participants with mild-to-moderate PPA completed a structured interview detailing the type, frequency, and perceived effectiveness of 12 potential communication modes, categorized by technology required (no-tech, low-tech, and high-tech). The ratio of modes used was compared across technology categories with a repeated-measures generalized linear model assuming a binomial distribution with an overall Wald chi-square statistic, followed by pairwise post hoc t-test comparisons., RESULTS: Of the 12 communication modes assessed, participants reported using a median of eight (range: 5-10). All participants affirmed using speech, facial expressions, and talking on the phone. Frequency and perceived effectiveness ratings for these three modes were endorsed at the "some/most of the time" level for more than 80% of the participants. No-tech mode use was significantly higher than reported high-tech and low-tech modes ($p = .004$ and $p < .0001$, respectively). Even so, while some high-tech modes (apps) and some low-tech modes (nonelectronic augmentative and alternative communication) had fewer users, effectiveness ratings were moderate to high for all but one user., CONCLUSIONS: Persons with mild-to-moderate language impairment due to PPA report using a range of communication modes with moderate-to-high frequency and perceived effectiveness. These outcomes provide practical information when considering mode refinement or expansion during intervention to maximize communication participation. Barriers to modality use may include low awareness or access, which could be queried by future studies and supported by speech and language interventions., SUPPLEMENTAL MATERIAL: https://doi.org/10.23641/asha.21614262.

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4. **A Mobile-based Virtual Reality Speech Rehabilitation App for Patients With Aphasia After Stroke: Development and Pilot Usability Study**

Bu Xiaofan, Ng Peter Hf, Tong Ying, Chen Peter Q., Fan Rongrong, Tang Qingping, Cheng Qinqin, Li Shuangshuang, Cheng Andy Sk, Liu Xiangyu. 2022

BACKGROUNDStroke has the highest disability-adjusted life-years lost in any disease, and approximately one-third of the patients get aphasia. Computers and tablets are innovative and aid in intensive treatments in speech rehabilitation for patients with aphasia. However, mechanical training limits the help to patients.OBJECTIVEThis study aims to provide a framework for an integrated virtual reality (VR) app to provide speech rehabilitation for patients with aphasia.METHODSThe content was generated through an in-depth literature review and discussion with experienced rehabilitation physicians and occupational therapists. We then conducted a 2-round Delphi study with 15 experts from hospitals and universities to rate the content using a 5-point Likert scale. The app was developed by an interdisciplinary team involving VR, medical science of rehabilitation, and therapeutic rehabilitation. Pilot usability testing of this novel app was conducted among 5 patients with aphasia, 5 healthy volunteers, 5 medical staff, and 2 VR experts.RESULTSWe designed 4 modules of speech rehabilitation: oral expression, auditory comprehension, cognition, and comprehensive application. Our VR-based interactive and intelligent app was developed to provide an alternative option for patients with aphasia. Pilot usability testing revealed user satisfaction with the app.CONCLUSIONSThis study designed and tested a novel VR-based app for speech rehabilitation specifically adapted to patients with aphasia. This will guide other studies to develop a similar program or intelligent system in a clinical setting.

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5. **Adherence to Swallow Exercises during (Chemo)Radiotherapy for Head and Neck Cancer**

Dunton J., Lord R., Lee K., Doughty C., Bogotto A., O'Neill N., Kong A., Reis Ferreira M., Guerrero Urbano T., Petkar I., Lei M. 2022

Purpose/Objective(s): Patients undergoing curative (chemo)radiotherapy ((C)RT) for head and neck cancer (HNC) who experience or are at risk of developing dysphagia are often provided with pre-treatment swallow exercises (SE), in line with consensus opinion for best practice. Evidence of SE efficacy is limited, with adherence cited as a confounding factor. We evaluated SE adherence in our patient group with the aim of proposing opportunities for improvement. Materials/Methods: A 16 item questionnaire was developed with input from patients, speech and language therapists (SLTs) and oncologists, including quantitative and qualitative questions covering demographics, patient reported swallow function, understanding of and confidence with SE, frequency of completion, and resources that could improve adherence. The questionnaire was offered in paper or electronic format (Civica Software) to patients who completed (C)RT over a 3-month period. All patients had received swallow exercises as per our standard protocol with advice to

complete them 7-10 times per day, supported by a written leaflet and regular SLT review during treatment. Result(s): Of 39 patients who completed (C)RT, 90% (n=35) completed the questionnaire; 51% (n=18) treated with primary (C)RT and 46% (n=16) post-operative (C)RT. Swallowing difficulties were reported by 31% (n=11) pre-(C) RT, rising to 71% (n=25) at end of treatment. Almost all (94%, n=33) stated they understood the rationale for SE. Frequency of completion was variable (Table 1). Treatment toxicities were reported as barriers to adherence by 51% (n=18). Over a third of patients (37%, n=13) felt only somewhat, slightly or not at all confident they were completing SE correctly. Regarding resources that would improve adherence, a leaflet with written instructions and pictures or diagrams was selected most frequently (46%, n=16), a website/app with videos was also popular (29%, n=10). 80% (n=28) planned to continue SE after treatment. 83% (n=29) rated their overall experience of SE and advice as either good or very good. Conclusion(s): A questionnaire offers a simple way to obtain a snapshot view of current experience, and our high response rate suggests results are reliable. Our findings suggest that our current recommendation of SE completion 7-10 times per day is not achievable for most patients; a change in recommendation to 3-5 times per day is supported by recent evidence and encourages self-efficacy. At least a third of patients lacked confidence in completing SE, and we are focusing on this by developing new pictorial, online and video resources. Our survey indicated high overall satisfaction with our current service despite variable adherence. Future work will evaluate the impact of service improvements on patient outcomes.
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6. **Algorithm based hearing and speech therapy rehabilitation after cochlear implantation**

Theda E., Wiebke R., Franz K., Christoph K., Michael R., Felix B., Henning W., Tobias S., Christoph S., Ingo T. 2022

Introduction Due to the changes in the guidelines for cochlear implants and the demographic development, more and more people get cochlear implants. An implantation requires a close-meshed audiological and logopedic aftercare. Hearing therapy rehabilitation currently requires a great personnel effort and is time consuming. Hearing and speech therapy rehabilitation can be supported by digital hearing training programs. However, the apps currently on the market are to a limited decree personalized and structured. Increasing digitalization makes it possible, especially in times of pandemics, to decouple hearing therapy treatment from everyday clinical practice. Material and Methods For this purpose, an app is in development that provides hearing therapy tailored to the patient. The individual factors that influence hearing outcome are taken into account. Using intelligent algorithms, the app determines the selection of exercises, the level of difficulty and the speed at which the difficulty is increased. Results The app works autonomously without being connected to local speech therapists. In addition, the app is able to analyze patient difficulties within the exercises and provide conclusions about the need for technical adjustments. Conclusion In a growing cochlear implant environment with limited financial and personnel resources for hearing rehabilitation app based solutions are needed to secure high level outcomes with the cochlear implant.

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7. **APPLICATION OF IT TECHNOLOGY IN THE MANAGEMENT OF VOICE-SPEECH DISORDERS AND PHONIATRIC REHABILITATION**

Abisheva Y., Rusetsky Y., Daniyarova A., Azhenov T., Imasheva B., Almabayev Y., Turysbekova D., Utegenov A. 2022

Introduction. Up to date, various mobile medical apps were proposed, including digital platforms for diagnoses of speech impairment. The review aims to assess the effectiveness of mobile health (m-Health) platforms for patients with speech and voice disorders. Material and methods. We conducted a systematic review of studies published between 2008 and 2021. 234 articles from PubMed, Web of Science, and Cochrane Library databases were pre-selected for the review. Only articles related to the use of medical applications for smartphones, tablets, or computer devices studies were included in the analysis. Results. A total of 111 full-text articles were assessed for eligibility, and 37 were included in this study. The selected reports cover research on the use of mobile applications for therapy, rehabilitation assistance, and diagnoses. In terms of application, mobile apps have been developed for patients (children and adults) with speech disorders caused by autism, neuro-developmental speech impairment, Parkinson's disease, aphasia, voice disorders, etc. Conclusions. The analysis showed that the m-Health market offers various mobile applications for persons with speech impairments (as an adjuvant tool for therapy and rehabilitation). Despite the existence of a range of m-Health applications for patients with speech disorders, there is a need for further large-scale studies aimed at studying their effectiveness, safety, and reliability.

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8. **Attitudes and use patterns for mobile technology and upper extremity home exercises in stroke survivors in the United States**

Kim Hayejin, Kim Grace J. 2022

Introduction: The use of mobile technology (MT) in home-based occupational therapy is expected to continue growing. This study describes daily use patterns for MT and upper extremity (UE) home exercise programs (HEPs) for community-dwelling stroke survivors in the United States. Method: Cross-sectional survey. Data were analyzed using descriptive statistics and bivariate comparisons. Results: N = 61 (30 stroke and 31 controls). Individuals with stroke had similar levels of knowledge, skill, and use of MT compared with non-disabled age-matched adults. Stroke participants used MT more frequently for information searching, social media, and reminders compared to control participants. Stroke participants were motivated to improve UE function (93.3%) and reported a need for additional HEP training (56.7%). Perceived facilitators to improve UE use included talking to peers (73.3%), getting more information (73.3%), and talking to a therapist (63.3%). Conclusions: MT may have multiple potential benefits when integrated into occupational therapy practice including supporting instrumental ADLs, facilitating social connection, and increasing adherence to UE HEPs. Future work should focus on maximizing adherence and providing performance feedback through the use of social media to promote peer support and consistent remote communication using text messaging, phone calls, or video calls to deliver information and reminders on exercises.

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9. **Complementing the speech therapy method with new approaches to speech and language rehabilitation in post-stroke aphasia**

Loevenbruck H., Baciu M. 2022

Speech and language rehabilitation in post-stroke aphasia is fundamental to help patients regain their communication skills, as well as their family, social, and professional integration. However, in the chronic phase, the effectiveness of the classic rehabilitation method (the speech therapy method) decreases and the access to care becomes more complicated due to geographi-cal, financial, and health-related limitations. Thus, new rehabilitation programs combining conventional rehabilitation approaches with new ones seem to be necessary. In this brief review, we will present several potentially useful methods in chronic aphasia, such as induced constraint therapy, music therapy, and technological methods (tele-rehabilitation). We postulate that in order to choose the most appropriate rehabilitation program, three principles should be respected: intensity (apply intensive rehabilitation), social engage-ment (promote social interaction and communication), and personalization (adapt to the patients' skills and take into account their recovery goals). We propose a rehabilitation program that combines traditional rehabilitation and tele-rehabilitation (rehabilitation in autonomy, via applications on a computer or tablet). This program has several advan-tages: it increases the intensity of the rehabilitation, promotes social involvement with the involvement of family and friends, and adapts to the patient's difficulties and the skills this patient wishes to improve. Copyright © 2022, John Libbey. All rights reserved.
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10. **Continuous TBI Monitoring From Spontaneous Speech Using Parametrized Sinc Filters and a Cascading GRU**

Ditthapron Apiwat, Lammert Adam C., Agu Emmanuel O. 2022

Traumatic Brain Injury (TBI) is caused by a head injury that affects the brain, impairing cognitive and communication function and resulting in speech and language disorders. Over 80,000 individuals in the US suffer from long-term TBI disabilities and continuous monitoring after TBI is essential to facilitate rehabilitation and prevent regression. Prior work has demonstrated the feasibility of TBI monitoring from speech by leveraging advancements in Artificial Intelligence (AI) and speech processing technology. However, much of prior work explored TBI detection using scripted speech tasks such as diadochokinesis tests or reading a passage. Such scripted approaches require active user involvement that significantly burdens participants. Moreover, they are episodic, are not realistic, and do not provide a longitudinal picture of the user's TBI condition. This study proposes a continuous TBI monitoring from changes in acoustic features of spontaneous speech collected passively using the smartphone. Low-level acoustic features are extracted using parametrized Sinc filters (pSinc) that are then classified TBI (yes/no) using a cascading Gated Recurrent Unit (cGRU). The cGRU model utilizes a cell gate unit in the GRU to store and incorporate each individual's prediction history as prior knowledge into the model. In rigorous evaluation, our proposed method outperformed prior TBI classification methods on conversational speech recorded during patient-therapist discourses following TBI, achieving 83.87% balanced accuracy. Furthermore, unique words that are important in TBI prediction were identified using SHapley Additive exPlanations (SHAP). A correlation was also found between features acquired by the proposed method and coordination deficits following TBI.
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11. **Deep learning applications in telerehabilitation speech therapy scenarios**

Mulfari D., La Placa D., Rovito C., Celesti A., Villari M. 2022

Nowadays, many application scenarios benefit from automatic speech recognition (ASR) technology. Within the field of speech therapy, in some cases ASR is exploited in the treatment of dysarthria with the aim of supporting articulation output. However, in presence of atypical speech, standard ASR approaches do not provide any reliable result in terms of voice recognition due to main issues, including: (i) the extreme intra and inter-speakers variability of the speech in presence of speech impairments, such as dysarthria; (ii) the absence of dedicated corpora containing voice samples from users with a speech disability to train a state-of-the-art speech model, particularly in non-English languages. In this paper, we focus on isolated word recognition for native Italian speakers with dysarthria and we exploit an existing mobile app to collect audio data from users with speech disorders while they perform articulation exercises for speech therapy purposes. With this data availability, a convolutional neural network has been trained to spot a small number of keywords within atypical speech, according to a speaker dependent method. Finally, we discuss the benefits of the trained ASR system in tailored telerehabilitation contexts intended for patients with dysarthria who can follow treatment plans under the supervision of remote speech language pathologists.Copyright © 2022 Elsevier Ltd
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12. **Digital Health and Learning in Speech-Language Pathology, Phoniatrics, and Otolaryngology: Survey Study for Designing a Digital Learning Toolbox App**

Lin Yuchen, Lemos Martin, Neuschaefer-Rube Christiane. 2022

Background: The digital age has introduced opportunities and challenges for clinical education and practice caused by infinite incoming information and novel technologies for health. In the interdisciplinary field of communication sciences and disorders (CSD), engagement with digital topics has emerged slower than in other health fields, and effective strategies for accessing, managing, and focusing on digital resources are greatly needed. Objective: We aimed to conceptualize and investigate preferences of stakeholders regarding a digital learning toolbox, an app containing a library of current resources for CSD. This cross-sectional survey study conducted in German-speaking countries investigated professional and student perceptions and preferences regarding such an app’s features, functions, content, and associated concerns. Methods: An open web-based survey was disseminated to professionals and students in the field of CSD, including speech-language pathologists (SLPs; German: Logopäd*innen), speech-language pathology students, phoniatricians, otolaryngologists, and medical students. Insights into preferences and perceptions across professions, generations, and years of experience regarding a proposed app were investigated. Results: Of the 164 participants, an overwhelming majority (n=162, 98.8%) indicated readiness to use such an app, and most participants (n=159, 96.9%) perceived the proposed app to be helpful. Participants positively rated app functions that would increase utility (eg, tutorial, quality rating function, filters based on content or topic, and digital format); however, they had varied opinions regarding an app community feature. Regarding app settings, most participants rated the option to share digital resources through social media links (144/164, 87.8%), receive and manage push notifications (130/164, 79.3%), and report technical issues (160/164, 97.6%) positively. However, significant variance was noted across professions (H3=8.006; P=.046) and generations (H3=9.309; P=.03) regarding a

username-password function, with SLPs indicating greater perceived usefulness in comparison to speech-language pathology students (P=.045), as was demonstrated by Generation X versus Generation Z (P=.04). Participants perceived a range of clinical topics to be important; however, significant variance was observed across professions, between physicians and SLPs regarding the topic of diagnostics (H3=9.098; P=.03) and therapy (H3=21.236; P<.001). Concerns included technical challenges, data protection, quality of the included resources, and sustainability of the proposed app. Conclusions: This investigation demonstrated that professionals and students show initial readiness to engage in the co-design and use of an interdisciplinary digital learning toolbox app. Specifically, this app could support effective access, sharing, evaluation, and knowledge management in a digital age of rapid change. Formalized digital skills education in the field of CSD is just a part of the solution. It will be crucial to explore flexible, adaptive strategies collaboratively for managing digital resources and tools to optimize targeted selection and use of relevant, high-quality evidence in a world of bewildering data.

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13. **Dosage Frequency Effects on Treatment Outcomes Following Self-managed Digital Therapy: Retrospective Cohort Study**

Cordella Claire, Munsell Michael, Godlove Jason, Anantha Veera, Advani Mahendra, Kiran Swathi. 2022

BACKGROUNDAlthough the efficacy of high-dose speech-language therapy (SLT) for individuals with poststroke aphasia has been established in the literature, there is a gap in translating these research findings to clinical practice. Therefore, patients continue to receive suboptimal amounts of SLT, with negative consequences for their functional communication recovery. Recent research has identified self-managed digital health technology as one way to close the dosage gap by enabling high-intensity therapy unrestricted by clinician availability or other practical constraints. However, there is limited empirical evidence available to rehabilitation professionals to guide dose prescriptions for self-managed SLT despite their increasing use in the COVID-19 era and likely beyond.OBJECTIVEThis study aims to leverage real-world mobile health data to investigate the effects of varied dosage frequency on performance outcomes for individuals with poststroke speech, language, and cognitive deficits following a 10-week period of self-managed treatment via a commercially available digital health platform.METHODSAnonymized data from 2249 poststroke survivors who used the Constant Therapy app between late 2016 and 2019 were analyzed. The data included therapy tasks spanning 13 different language and cognitive skill domains. For each patient, the weekly therapy dosage was calculated based on the median number of days per week of app use over the 10-week therapy period, binned into groups of 1, 2, 3, 4, or ≥5 days per week. Linear mixed-effects models were run to examine change in performance over time as a function of dosage group, with post hoc comparisons of slopes to evaluate the performance gain associated with each additional day of practice.RESULTSAcross all skill domains, linear mixed-effects model results showed that performance improvement was significantly greater for patients who practiced 2 (β=.001; t15,355=2.37; P=.02), 3 (β=.003; t9738=5.21; P<.001), 4 (β=.005; t9289=7.82; P<.001), or ≥5 (β=.005; t6343=8.14; P<.001) days per week compared with those who only practiced for 1 day per week. Post hoc comparisons confirmed an incremental dosage effect accumulating with each day of practice (ie, 1 day vs 2 days, 2 days vs 3 days, and 3 days vs 4 days), apart from 4 days versus ≥5 days of practice per week. The result of greater improvement for higher versus lower dosage frequency groups was true not only across all domains but also within a majority of individual subdomains.CONCLUSIONSThe findings from this study demonstrated that increased dosage frequency is associated with greater therapy gains over a 10-week treatment period of self-managed digital therapy. The use of real-world data maximizes the ecological validity of study results and makes the findings more generalizable to clinical settings. This study represents an important step toward the development of optimal dose recommendations for self-managed SLT.

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14. **Effects of a new speech support application on intensive speech therapy and changes in functional brain connectivity in patients with post-stroke aphasia**

Katsuno Y., Ueki Y., Ito K., Murakami S., Aoyama K., Oishi N., Kan H., Matsukawa N., Nagao K., Tatsumi H. 2022

Aphasia is a language disorder that occurs after a stroke and impairs listening, speaking, reading, writing, and calculation skills. Patients with post-stroke aphasia in Japan are increasing due to population aging and the advancement of medical treatment. Opportunities for adequate speech therapy in chronic stroke are limited due to time constraints. Recent studies have reported that intensive speech therapy for a short period of time or continuous speech therapy using high-tech equipment, including speech applications (apps, can improve aphasia even in the chronic stage. However, its underlying mechanism for improving language function and its effect on other cognitive functions remains unclear. In the present study, we investigated whether intensive speech therapy using a newly developed speech support app could improve aphasia and other cognitive functions in patients with chronic stroke. Furthermore, we examined whether it can alter the brain network related to language and other cortical areas. Thus, we conducted a prospective, single-comparison study to examine the effects of a new speech support app on language and cognitive

functions and used resting state functional MRI (rs-fMRI) regions of interest (ROI) to ROI analysis to determine changes in the related brain network. Two patients with chronic stroke participated in this study. They used the independent speech therapy system to perform eight sets of 20 randomly presented words/time (taking approximately 20 min), for 8 consecutive weeks. Their language, higher cognitive functions including attention function, and rs-fMRI, were evaluated before and after the rehabilitation intervention using the speech support app. Both patients had improved pronunciation, daily conversational situations, and attention. The rs-fMRI analysis showed increased functional connectivity of brain regions associated with language and attention related areas. Our results show that intensive speech therapy using this speech support app can improve language and attention functions even in the chronic stage of stroke, and may be a useful tool for patients with aphasia. In the future, we will conduct longitudinal studies with larger numbers of patients, which we hope will continue the trends seen in the current study, and provide even stronger evidence for the usefulness of this new speech support app. Copyright © 2022 Katsuno, Ueki, Ito, Murakami, Aoyama, Oishi, Kan, Matsukawa, Nagao and Tatsumi.

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15. **Increasing Adherence to Prophylactic Swallowing Exercises During Head and Neck Radiotherapy: The Multicenter, Randomized Controlled PRESTO-Trial**

Baudelet Margot, Duprez Frederic, Van den Steen Leen, Nuyts Sandra, Nevens Daan, Goeleven Ann, Vandenbruaene Caroline, Massonet Hanne, Vergauwen Alice, Bollen Heleen, Deschuymer Sarah, Wouters Kristien, Peeters Marc, Van Laer Carl, Marien Steven, Van den Brekel Michiel, van der Molen Lisette, Vauterin Tom, van Dinther Joost, Verstraete Hilde, Hutsebaut Isabel, Meersschout Sabine, Vanderveken Olivier, De Bodt Marc, Van Nuffelen Gwen. 2022

BACKGROUND: Prophylactic swallowing exercises (PSE) during radiotherapy can significantly reduce dysphagia after radiotherapy in head and neck cancer (HNC). However, its positive effects are hampered by low adherence rates during the burdensome therapy period. Hence, the main goal of this multicenter randomized controlled trial (RCT) was to investigate the effect of 3 different service-delivery modes on actual patients' adherence., METHODS: A total of 148 oropharyngeal cancer patients treated with primary (chemo)radiotherapy were randomly assigned to a 4 weeks PSE program, either diary-supported (paper group; n = 49), app-supported (app group; n = 49) or therapist-supported (therapist group; n = 50). Participants practiced 5 days/week, daily alternating tongue strengthening exercises with chin tuck against resistance exercises. Adherence was measured as the percentage of completed exercise repetitions per week (%reps). Statistical analysis was performed by means of SPSSv27, using Linear Mixed-effects Models with post hoc pairwise testing and Bonferroni-Holm correction., RESULTS: Adherence and evolution of adherence over time was significantly different between the three groups ($p < .001$). Adherence rates decreased in all three groups during the 4 training weeks ($p < .001$). During all 4 weeks, the therapist group achieved the highest adherence rates, whilst the app group showed the lowest adherence rates., CONCLUSIONS: PSE adherence decreased during the first 4 radiotherapy weeks regardless of group, but with a significant difference between groups. The therapist group achieved the highest adherence rates with a rather limited decline, therefore, increasing the face-to-face contact with a speech-language therapist can overcome the well-known problem of low adherence to PSE in this population., TRIAL REGISTRATION: Trial registration: ISRCTN, ISRCTN98243550. Registered December 21, 2018 - retrospectively registered, https://www.isrctn.com/ISRCTN98243550?q=gwen%20van%20nuffelen&filters=&sort=&offset=1&totalResults=2&page=1&pageSize=10&searchType=basic-search . Copyright © 2022. The Author(s).

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16. **Multicultural Considerations in Augmentative and Alternative Communication**

Frick B. J., Bean A. F., Sonntag A. M. 2022

Little is known about how well high-tech augmentative and alternative communication (AAC) systems accommodate language variation to meet the needs of people and families who are culturally and linguistically diverse. The purpose of this study was to investigate how high-tech AAC device manufacturers consider language variation and multilingualism in device design and language files, whether there is a difference in the modifications available on default language files on a dedicated AAC device as compared to communication applications on tablets, and the availability of these modifications. A coding schema was developed to assess features available that enabled user modification of default language files across four language domains: semantics, morphosyntax, phonology, and pragmatics. The results indicated that more changes were possible in semantics and phonology on default language files. There were not significant differences between language files offered on a dedicated AAC device or an application on a tablet. There were significant differences in the capabilities of the device to make modifications and in the ease of programming, but not in the resources provided to families. Based on these findings, it appears that device manufacturers have just begun to address the needs of families and users who are culturally and linguistically diverse.

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17. **Overcoming the language barrier in hearing- and speech rehabilitation by using multilingual conversational applications**

Wiebke R., Theda E., Holger S., Ingo T. 2022

Background In order to achieve the best possible hearing and understanding with a cochlear implant, hearing and speech therapy is necessary. In order to make treatment possible for hearing impaired people with a migration background, an alternative solution in rehabilitation is needed. The aim of the study was to evaluate six multilingual conversational apps with regard to their suitability for use in auditory speech therapy. Methods The six most commonly used apps were evaluated in terms of availability, cost, number of languages available, accuracy of content and grammatical translation, pronunciation, ease of use and features. Translation accuracy was assessed for five languages (English, Spanish, Arabic, Turkish, Russian) by native speakers for different levels of complexity. The other categories were evaluated in terms of practicality in the therapeutic process. Results All apps offer translations for many languages and can be used intuitively. The flow of communication is altered by waiting times for the translation. The accuracy of the translations is between 71-85 % depending on the app. To compensate, it is advisable to prepare the language material with a pre-translation and have it checked by native speakers. Summary: Multilingual conversation apps can make therapy in a foreign language much easier. Further adaptation of the software to the specific requirements of an auditory speech therapy is necessary to reach a native speaker level and to enable easy use in therapy.

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18. **Protocol for Rhapsody: a longitudinal observational study examining the feasibility of speech phenotyping for remote assessment of neurodegenerative and psychiatric disorders**

Hampsey Elliot, Meszaros Marton, Skirrow Caroline, Strawbridge Rebecca, Taylor Rosie H., Chok Lazarus, Aarsland Dag, Al-Chalabi Ammar, Chaudhuri Ray, Weston Jack, Fristed Emil, Podlewska Aleksandra, Awogbemila Olabisi, Young Allan H. 2022

IntroductionNeurodegenerative and psychiatric disorders (NPDs) confer a huge health burden, which is set to increase as populations age. New, remotely delivered diagnostic assessments that can detect early stage NPDs by profiling speech could enable earlier intervention and fewer missed diagnoses. The feasibility of collecting speech data remotely in those with NPDs should be established.Methods and analysisThe present study will assess the feasibility of obtaining speech data, collected remotely using a smartphone app, from individuals across three NPD cohorts: neurodegenerative cognitive diseases (n=50), other neurodegenerative diseases (n=50) and affective disorders (n=50), in addition to matched controls (n=75). Participants will complete audio-recorded speech tasks and both general and cohort-specific symptom scales. The battery of speech tasks will serve several purposes, such as measuring various elements of executive control (eg, attention and short-term memory), as well as measures of voice quality. Participants will then remotely self-administer speech tasks and follow-up symptom scales over a 4-week period. The primary objective is to assess the feasibility of remote collection of continuous narrative speech across a wide range of NPDs using self-administered speech tasks. Additionally, the study evaluates if acoustic and linguistic patterns can predict diagnostic group, as measured by the sensitivity, specificity, Cohen's kappa and area under the receiver operating characteristic curve of the binary classifiers distinguishing each diagnostic group from each other. Acoustic features analysed include mel-frequency cepstrum coefficients, formant frequencies, intensity and loudness, whereas text-based features such as number of words, noun and pronoun rate and idea density will also be used.Ethics and disseminationThe study received ethical approval from the Health Research Authority and Health and Care Research Wales (REC reference: 21/PR/0070). Results will be disseminated through open access publication in academic journals, relevant conferences and other publicly accessible channels. Results will be made available to participants on request.Trial registration numberNCT04939818.https://libkey.io/libraries/2762/openurl?genre=article&au=Hampsey%2C+Elliot%3BMeszaros%2C+Marton%3BSkirrow%2C+Caroline%3BStrawbridge%2C+Rebecca%3BTaylor%2C+Rosie+H%3BLazarus+Chok%3BAarsland%2C+Dag%3BAl-Chalabi%2C+Ammar%3BChaudhuri%2C+Ray%3BWeston%2C+Jack%3BFristed%2C+Emil%3BPodlewska%2C+Aleksandra%3BAwogbemila%2C+Olabisi%3BYoung%2C+Allan+H&aulast=Hampsey&issn=&isbn=&title=Protocol+for+Rhapsody%3A+a+longitudinal+observational+study+examining+the+feasibility+of+speech+phenotyping+for+remote+assessment+of+neurodegenerative+and+psychiatric+disorders&jtitle=BMJ+Open&pubname=BMJ+Open&btitle=&atitle=Protocol+for+Rhapsody%3A+a+longitudinal+observational+study+examining+the+feasibility+of+speech+phenotyping+for+remote+assessment+of+neurodegenerative+and+psychiatric+disorders&volume=12&issue=6&spage=e061193&date=2022&doi=10.1136%2Fbmjopen-2022-061193&sid=ProQuest https://media.proquest.com/media/hms/PFT/1/Ga7DN?_a=ChgyMDIzMDMwODExNTYxNzQwMjo5MTI5NzQSBTc5MTY3GgpPTkVfU0VBUkNIIg01LjE0OC4xMzUuMTg2KgcyMDQwOTc1MgoyNjc0NTUzMjE4Og1Eb2N1bWVudEltYWdlQgEwUgZPbmxpbmVaAkZUYgNQRlRqCjIwMjIvMDEvMDFyCjIwMjIvMTIvMzF6AIIBM1AtMTAwNzA2Ny0xNDY0NTQtQ1VTVE9NRVItMTAwMDAyNzAvMTAwMDAxNTUtNTg5MTc2NzIBBk9ubGluZcoBgQFNb3ppbGxhLzUuMCAoV2luZG93cyBOVCAxMC4wOyBXaW42NDsgeDY0KSBBcHBsZVdlYktpdC81MzcuMzYgKEtlVE1MLCBsaWtlIEdlY2tvKSBDaHJvbWUvMTEwLjAuMC4wIFNhZmFyaS81MzcuMzYgRWRnLzExMC4wLjE1ODcuNjPSARJTY2hvbGFybHkgSm91cm5hbHOaAgdQcmVQYWlkqgIrT1M6RU1TLU1IZGlhTGlua3NTZXJ2aWNlLWdldE1IZGlhVXJsRm9ySXRlbcoCD0FydGljbGV8RmVhdHVyZdICAVnyAgD6AgFZggMDV2ViigMcQ0lEOjIwMjMwMzA4MTE1NjE3NDAyOjMxMzgzNw%3D%3D&_s=XmfNGE5EdYSVHOMoypz6cvIxYTI%3D this link

19. **Recognising and responding to communication and swallowing difficulties in Parkinson's disease**

Ireland Sally, Carroll Vincent, Blanchard Denise, Rossiter Rachel. 2022

The precise neural mechanisms of dysarthria (difficulties with speech and voice) and dysphagia (swallowing difficulties) have not been identified to date.3 Language processing deficits specific to Parkinsons disease have been described, although the relationship with broader cognitive deficits is unclear.45 Early identification of risk is important in treating dysphagia to help prevent pneumonia in people with Parkinsons disease.6 Communication difficulties For almost 90% of those living with Parkinsons disease, communication difficulties have a significant impact on day-to-day functioning.4 Early onset of speech difficulties is common, and these become increasingly debilitating as the disease progresses.78 Emerging research has identified variations in voice frequency in prodromal Parkinsons disease up to five years before diagnosis.9 Figure 1 briefly describes communication-related terminology relevant to this discussion. While language difficulties increase with cognitive decline, 30-40% of people with Parkinsons disease without significant cognitive deficits have unique linguistic difficulties, such as difficulties with comprehension, word finding and verbal fluency.513 A further contributor to communication difficulties is the marked reduction in facial expression (hypomimia) or amimia (absence of facial expression). Oropharyngeal dysphagia affects the person's quality of life and socialisation and has been shown to contribute to malnutrition and dehydration,19 with poor nutritional status adversely affecting the person's capacity to undertake activities of daily living.20 The person's ability to take oral medication safely is also impaired,16 with tablets remaining in the oral cavity or lodging in the pharynx.21 Oropharyngeal dysphagia markedly increases the risk of aspiration pneumonia, identified as the leading cause of death in Parkinson's disease.22 Sialorrhea (drooling) is often associated with dysphagia. Emerging findings also suggest that participation in therapeutic group singing for people with Parkinson's disease affects social interaction positively and may improve vocal function and respiratory pressure.31'32 Early referral to a speech pathologist for those with a positive swallowing screening test is likewise important to identify and r`educe the risks of aspiration, choking, dysphagia-related malnutrition and dehydration. https://libkey.io/libraries/2762/openurl?genre=article&au=Ireland%2C+Sally%3BCarroll%2C+Vincent%3BBlanchard%2C+Denise%3BRossiter%2C+Rachel&aulast=Ireland&issn=22087958&isbn=&title=Recognising+and+responding+to+communication+and+swallowing+difficulties+in+Parkinson%27s+disease&jtitle=Australian+Journal+of+General+Practice&pubname=Australian+Journal+of+General+Practice&btitle=&atitle=Recognising+and+responding+to+communication+and+swallowing+difficulties+in+Parkinson%27s+disease&volume=51&issue=4&spage=239&date=2022&doi=&sid=ProQuest https://media.proquest.com/media/hms/PFT/1/qOjSM?_a=ChgyMDIzMDMwODExNTYxNzQwMjo5MTI5NzQSBTc5MTY3GgpPTkVfU0VBUkNIIg01LjE0OC4xMzUuMTg2KgUzMzY2ODIKMjY0NzQwOTI4ODoNRG9jdW1lbnRJbWFnZUIBMFIGT25saW5lIWgJGVGIDUEZUagoyMDIyLzA0LzAxcgoyMDIyLzA0LzMwegCCATNQLTEwMDcwNjctMTQ2NDU0LUNVU1RPTUVSLTEwMDAwMjcwLzEwMDAwMTU1LTU4OTE3NjWSAQZPbmxpbmXKAYEBTW96aWxsYS81LjAgKFdpbmRvd3MgTlQgMTAuMDsgV2luNjQ7IHg2NCkgQXBwbGVXZWJLaXQvNTM3LjM2IChLSFRNTCwgbGlrZSBHZWNrbykgQ2hyb21lLzExMC4wLjAuMCBTYWZhcmkvNTM3LjM2IEVkZy8xMTAuMC4xNTg3LjYz0gESU2Nob2xhcmx5IEpvdXJuYWxzmgIHUHJlUGFpZKoCK09TOkVNUy1NZWRpYUxpbmtzU2VydmljZS1nZXRNZWRpYVVy

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20. **Tablet-Based Cognitive Stimulation in Parkinson's Disease: What Really Happens?**

Grabowski C., Patel S., Dayalu V. 2022

Research Objectives: 1) To determine whether a remote tablet-based cognitive intervention program can improve measures of cognition for individuals with Parkinson's Disease (PD). 2) To examine the effects of remote coaching-style support on measures of cognition and adherence. Design(s): Dual series of two 4-week tablet-based cognitive intervention in a within-subjects pre-post ABAC/ACAB design (counterbalanced) to assess changes in cognition and adherence in each phase (tablet activity with or without 3x/week meetings) with 2-week hiatus between phases. Setting(s): General community. Participant(s): Target n=12 (n=5 currently). Inclusion: Age 50+, proficiency in English, diagnosis of PD, no other neurological history, vison/hearing corrected to functional, and upper extremity function for tablet use. Exclusions: premorbid cognitive impairment, severe hearing, visual, or upper extremity impairment, concurrent speech therapy. Intervention(s): Baseline & Post Testing (A): demographics, Unified Parkinson's Disease Rating Scale (UPDRS), subtests of Woodcock Johnson Test of Oral Language (WCJTOL) for cognition. Independent (B): Participants complete cognitive activities (e.g. n-back, pattern replication) using a tablet application using loaned iPads (4 weeks). Supported (C): Participants complete the identical protocol of Phase B with additional verbal feedback via 10-minute video conference 3x/week (4 weeks). Main Outcome Measure(s): Repeated measures analysis of variance with within-subjects factor of intervention phase (B or C) will be used to determine differences in cognitive measures (UPDRS, WCJTOL). Comparative changes in adherence during interventions will also be examined. Result(s): Preliminary findings (n=7) for independent tablet activity demonstrate varying adherence (MEAN=18.85/28 days; RANGE 13:26). Participants improved or maintained scores on UPDRS. Average score change in WCJTOL Rapid Picture Naming was 6.6 items (RANGE 4:13); Sentence Repetition average change was 1.16 items (RANGE 1:5). Full analysis will be completed upon full data collection in Summer 2022. Conclusion(s): This clinically relevant work aims to determine practical approaches for effective stimulation in the face of service limits. Findings will reveal feasibility and effectiveness of such interventions for people with PD. Author(s) Disclosures: Funding for this work is through an internal grant by the University Research Council at Seton Hall University. No other relevant disclosures.

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21. **Technological advancements in stroke rehabilitation**

Malik Arshad Nawaz, Tariq Hina, Afridi Ayesha, Rathore Farooq Azam. 2022

Early, coordinated, and multidisciplinary rehabilitation plays a major part in motor recovery after stroke. The conventional stroke rehabilitation primarily includes physical therapy, occupational therapy, and speech therapy. However, with these conventional methods, many stroke survivors still have a residual functional disability which impairs their ability to perform activities of daily living. This could be attributed to the insufficient therapy dose, low engagement and motivation of the patient, and lack of objective feedback to achieve significant improvements in function. Various technology-based stroke rehabilitation interventions have been developed in the last few decades which have shown promising results in improving stroke patients' functional mobility and independence. The use of technology promotes repetitive, task-specific training, active engagement of patients, integrating constructive and concurrent feedback, and accurately measuring functional improvement. This review summarizes the important technological advances in stroke rehabilitation, including exergames, telerehabilitation, robotic-assisted systems, virtual and augmented reality, wearable sensors, and smartphone applications.

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22. **The Feasibility of a Smartphone-based Digital Therapeutics for Dysarthria after Stroke (DiDaS): Protocol for a pilot randomized controlled trial**

Kim Y., Kim M., Kim J., Song T. -J. 2022

Background: Dysarthria is a motor speech disorder occurring from neurological conditions such as stroke. It leads to serious problems in the intelligibility of patients' speech, affecting their ability to communicate, quality of life, and emotional well-being. While digital therapeutic approaches for rehabilitation of dysarthria are increasing, clinical evidence of the effectiveness of digital therapeutics has been lacking. A mobile application, D-ST01, has the potential to enhance intensive and repetitive speech rehabilitation due to its high treatment accessibility and its incorporation of gamification, tailored feedback, and interactive functions. Method(s): In our trial, 60 stroke patients with dysarthria within 30 days following the occurrence of stroke will be recruited. In a 1:1 ratio, participants will be randomly assigned to either the intervention group (using D-ST01 for 60 minutes/day, five days/week along with usual stroke care) or the control group (usual stroke care only). This will be a single-blind study in which researchers will evaluate outcome measurements while masked to treatment allocation. After four weeks of treatment intervention, we will compare speech and psychological changes between the two groups. Conclusion(s): Our study will evaluate the feasibility of the speech treatment application DST01 for patients with post-stroke dysarthria. In addition, it will collect evidence for investigating the future efficacy of a large-scale randomized controlled trial.

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23. **THE IMPORTANCE OF APHASIA COMMUNICATION GROUPS IN PEOPLE WITH CHRONIC STROKE**

Charalambous M., Kambanaros M. 2022

Background and Aims: Chronic aphasia after stroke is linked to poor functional recovery, depression, and social isolation. In the exploration of the above factors, the role of aphasia communication groups has evolved. Aphasia communication groups for stroke survivors with chronic aphasia and their communication buddies are gaining clinical importance. Method(s): Communication buddies can be family members, friends, carers, health professionals and speech and language therapy students who serve as communication facilitators for each group member. Group members share experiences on stroke and aphasia by using technology/ tablets and the total communication approach. Result(s): The benefits or outcomes of group involvement are measured by assessment of functional communication, individual selfratings of the impact of aphasia on communication and quality of life after

stroke. Conclusion(s): The use of the communication buddy system, total communication approach and systematic evaluations enables therapists to measure the effectiveness and efficacy of communication groups in terms of functional communication, social inclusion and quality of life.
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24. **Understanding User Needs for Digital Aphasia Therapy: Experiences and Preferences of Speech and Language Therapists**

Cuperus P., de Kok D., de Aguiar V., Nickels L. 2022
Background: Aphasia therapy software applications (apps) can help achieve recommendations regarding aphasia treatment intensity and duration. However, we currently know very little about speech and language therapists' (SLTs) preferences with regards to these apps. This may be problematic, as clinician acceptance of novel treatments and technology are a key factor for successful translation from research evidence to practice. Aim(s): This research aimed to increase our understanding of clinicians' experiences with aphasia therapy apps and their perceived barriers and facilitators to the use of aphasia apps. Furthermore, we wanted to explore the influence of some demographic factors (age, country, and SLT availability in the client's hometown) on SLTs' attitudes towards these apps. Method & Procedures: 35 Dutch and 29 Australian SLTs completed an online survey. The survey contained 9 closed-ended questions and 3 open-ended questions. Responses to the closed-ended questions were summarised through the use of descriptive statistics. The responses to the open questions were analysed and coded into recurring themes that were derived from the data. Logistic regression analyses were performed to explore the relationship between the demographic variables and the responses to the closed-ended questions. Outcomes & results: Participants were overwhelmingly positive about aphasia therapy apps and saw the potential for their clients to use apps independently. As facilitators of app use, participants reported accessibility and inclusion of different language modalities, while high costs, absence of a compatible device, and clients' potential computer illiteracy were listed as barriers. None of the analysed demographic factors consistently influenced differences in participants' attitudes towards aphasia therapy apps. Conclusion(s): The positive, extensive and insightful feedback from speech and language therapists is both useful and encouraging for app developers and aphasia researchers, and should facilitate the development of appropriate, high-quality therapy apps.
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25. **Usability Testing of an iPad Communication Application for Mechanically Ventilated Patients**

Guttormson Jill L., McAndrew Natalie S. 2022
Background: Patient communication challenges during mechanical ventilation can negatively impact symptom management and psychological recovery. Alternative communication (AC) aids have the potential to improve mechanically ventilated (MV) patient experiences. Objectives: This study evaluated the feasibility and usability of a communication application on a tablet (iPad). Method: A single-group pilot study was guided by the augmentative and alternative communication acceptance model. We recruited patients from 1 medical intensive care unit. Existing communication application software (Proloquo2Go) was tailored to MV patients' needs. Usability testing included patient communication of 5 messages with data collected on success, message completion time, and patient feedback. Results: Ten patients with a mean age of 50 years (SD, 16.7) were enrolled. Of the 7 patients able to complete usability testing, 85.7% found the device easy to use, and 100% wanted the iPad available for their use when on the ventilator. Three patients were extubated immediately after usability testing. Two patients preferred other modes of communication (writing). Two patients used the iPad as their primary mode of communication during the remainder of their time on the ventilator. Nurse feedback on the communication application was positive. Discussion: Tablet-based communication applications can be successfully used by MV patients and should be considered as 1 tool to support effective patient communication during mechanical ventilation. Future research is needed to identify which patients may be most likely to benefit from the availability of these devices.
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26. **Use of Speech Processing Technologies in Speech and Language Therapy**

Tuschen L. 2022
Approaches from learning research show that user-directed feedback within digital applications is necessary to increase therapy effectiveness. In face-to-face therapy context this is done by the therapist. In digital applications, assessment of speech production can be implemented through speech processing technologies. Automatic speech recognition is e. g. used in apps to assess speech intelligibility. Other acoustic methods enable the analysis of prosodic features. Particularly challenging is the variance of pathological speech production and the digital implementation of practice applications. This calls for interdisciplinary projects in order to use digital speech processing solutions for different target groups.
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27. **Why and How to Digitalize Bulbar Motor Dysfunction Patterns in NMD**

Siciliano G., Schirinzi E., Ricci G., Bechini A., Donati M., Marini M., Vanello N., Pelagatti S., Fattori B., Tavosanis M., Fanucci L. 2022
Bulbar motor dysfunction in neuromuscular disorders can be related to different grade of dysphagia, respiratory and speech processing deficits. Very few studies have investigated the prosodic characteristic of speech in this type of patients, considering the diffi culty to analyze the intersection between the different acoustic properties, such as pitch, speech and pause segment duration, speech rate. In last years Artificial intelligence (AI)applied in healthcare, changes many aspects of patient care, from diagnosis to follow-up, improving the quality of life of people suffering from physical disabilities. For example, AI can improve automatic speech recognition facilitating the interaction with smart devices through the simple use of voice. In particular, AI has been able to adapt and translate the speech of patients with mild to medium levels of dysarthria. Given the promising results, the DESIRE (improving Daily living for sEverely dySarthric people through enhanced automatIc speech Recognition tEchnology) project aims to create a clinical useful tool for prognostic and rehabilitation outcome monitoring purposes in dysarthric patients. Through several reading sessions the patients pronounce predetermined selected words aloud. At the end of each session, the tool offers a measure of how much the patient's pronunciation deviates from the one of the maprevious sessions, allowing the clinical specialists to work on phonemes that are more difficult for the patient to pronounce. The possibility to monitor the quality of the patient's verbal production over time allows to tailor the speech therapy treatment based on specific parameters (eg fatigue, reduced intelligibility, difficulty in producing some phonemes / clusters / specific words). This technological system has been tested in ALS patients and a pivotal study in

Myothonic Dystrophy type 1 patients is ongoing. The recognition of nonstandard natural language thanks to the collaboration among multidisciplinary competences represents a turning point for the production of solutions addressing communication needs in people with speech impairment, with high impact on the everyday quality of their life.
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28. **A Gesture-to-Speech Recognition Mobile Application Prototype**

Rafiq R. B., Karim S. A., Liu A., Albert M. V. 2021

Research. Objectives: We propose a mobile application that recognizes particular programmed movements of the device to elicit particular text-to-speech phrases. For people unable to speak and with limited mobility to use keyboards or tablets, this enables faster social interaction which can greatly improve their quality of life. Design: Initial prototype development and testing. Setting: General community.ParticipantsSix healthy subjects participated in repeated data collection of 11 distinct gestures for testing. Interventions: Not applicable.Main Outcome MeasuresA cross-platform mobile application is integrated with a deep learning LSTM model that can recognize distinct gestures performed by the user after two seconds of recording, which triggers a selected text-to-speech auditory response. Results: Eleven distinct gestures such as waving, horizontal line, vertical line, etc. data were collected through the accelerometer. Data were partitioned into three parts: training, validation and test. Training and validation data were used for training the model and the test set was used for evaluation. The model achieved 96% accuracy on average, with the errors primarily between one pair of challenging gestures to distinguish. Conclusions: The application is an early, readily shared demonstration of gesture-to-speech. Further development is intended to enable additional gestures and improve recognition accuracy and speed, with the goal of enabling more efficient communication for individuals unable to speak.Author(s) DisclosuresNone.

29. **A nonrandomized trial for student teachers of an in-person and telepractice global voice prevention and therapy model with estill voice training assessed by the voiceevalu8 app**

Grillo E. U. 2021

Purpose: This study investigated the effects of the in-person and telepractice Global Voice Prevention and Therapy Model (GVPTM) treatment conditions and a control condition with vocally healthy student teachers. Method(s): In this single-blinded, nonrandomized trial, 82 participants completed all aspects of the study. Estill Voice Training was used as the stimulability component of the GVPTM to train multiple new voices meeting all the vocal needs of the student teachers. Outcomes were assessed using acoustic, perceptual, and aerodynamic measures captured by the VoiceEvalU8 app at pre and post in fall and during student teaching in spring. Result(s): Significant improvements were achieved for several acoustic and perceptual measures in the treatment conditions, but not in the control condition. The in-person and telepractice conditions produced similar results. The all-voiced phrase and connected speech were more successful in demonstrating voice change for some of the perturbation measures as compared to sustained /a/. Conclusion(s): The treatment conditions were successful in improving the participants' voices for fundamental frequency and some acoustic perturbation measures while maintaining the improvements during student teaching. In addition, the treatment conditions were successful in decreasing the negative impact of voice-related quality of life and vocal fatigue during student teaching. Future research should address the effectiveness of the various components of the GVPTM, the application of the GVPTM with patients with voice disorders, the relevance of defining auditory-perceptual terms by the anatomy and physiology of the voice production system (i.e., Estill Voice Training), and the continued use of the VoiceEvalU8 app for clinical voice investigations.
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30. **A Pilot Study Comparing Teletherapy with the Conventional Face-to-Face Therapy for Speech-Language Disorders**

Tanvi Chaudhary, Anupam Kanodia, Hitesh Verma, Singh Chirom Amit, Mishra Ashwani Kumar, Kapil Sikka. 2021

Speech-language therapists along with affected individuals face various challenges for accomplishing the rehabilitation services. In the current COVID19 pandemic scenario, telerehabilitation has emerged as a substitute to the traditional face-to-face therapy, and is the only option possible in some cases. To subjectively assess the feasibility & acceptability of telerehabilitation provided by speech-language pathologist to patients of speech and language disorders. This qualitative study includes 20 patients suffering from disorders of fluency, voice, swallowing and neurogenic disorders. The participants included were undergoing face-to-face therapy at our institute. After the completion of face-to-face session series, telerehabilitation services were provided through a video calling app. The outcomes of teletherapy were assessed subjectively using a structured questionnaire on 11 parameters using a Likert scale. Of the included 20 patients, after completion of teletherapy, four patients chose the physical interaction as the preferred mode of therapy while 16 chose teletherapy as the preferred mode. Except three clients who rated their overall satisfaction as ‘3’, others rated as ‘4’ or ‘5’.The therapists were satisfied with the outcomes in 17 cases, and were pleased with the overall progress of all the clients (rated 4 or 5). Telerehabilitation is a reliable method to deliver speech and language services at community level, on long-term basis, as is proven by the high satisfaction scores among the clients as well as the service providers.Clinical Trial RegistrationThe trial has been registered in Clinical Trials Registry of India (CTRI) vide number CTRI/2018/04/ 012,922 (http://ctri.nic.in/Clinicaltrials/login.php) on 02/04/2018.
https://libkey.io/libraries/2762/openurl?genre=article&au=Chaudhary+Tanvi%3BKanodia+Anupam%3BVerma+Hitesh%3BSingh+Chirom+Amit%3BMishra%2C+Ashwani+Kumar%3BSikka+Kapil&aulast=Chaudhary+Tanvi&issn=22313796&isbn=&title=A+Pilot+Study+Comparing+Teletherapy+with+the+Conventional+Face-to-Face+Therapy+for+Speech-Language+Disorders&jtitle=Indian+Journal+of+Otolaryngology+%26+Head+and+Neck+Surgery&pubname=Indian+Journal+of+Otolaryngology+%26+Head+and+Neck+Surgery&btitle=&atitle=A+Pilot+Study+Comparing+Teletherapy+with+the+Conventional+Face-to-Face+Therapy+for+Speech-Language+Disorders&volume=73&issue=3&spage=366&date=2021&doi=10.1007%2Fs12070-021-02647-0&sid=ProQuest this link

31. **A resource analysis of the use of the video function of electronic devices for home exercise instruction in rehabilitation**

Emmerson K. B., Harding K. E., Fong C., Taylor N. F. 2021

PURPOSE: To compare resources required to provide paper-based versus videoed instructions for home exercises in rehabilitation. MATERIALS AND METHODS: An observational cohort study included twenty-two allied health professionals (physiotherapists n=13], occupational therapists n=6] and speech pathologists n=3]), providing exercise instructions for n=110 patients within a community rehabilitation program of a large metropolitan health service. Home exercise instructions were provided to patients with various health conditions. Patients chose between receiving paper-based home exercise instructions, or using their own smart technology to video

their home exercises. The primary outcome measure was cost from a health service perspective, based on health professional time, paper used, and printing. RESULT(S): A total of 128 initial home exercise instructions were provided to 110 patients, with 36 patients reviewed at least once. Each initial exercise instruction provided using electronic devices saved 5.5min (95% CI 0.5 to 10.5) with a cost saving of Australian dollar $4.70 (95% CI -8.89 to -0.52) compared with paper-based instructions. There were no significant cost differences (MD $1.16 95% CI -3.87 to 6.18) between modes for exercise review. CONCLUSION(S): Home exercise instructions provided on electronic devices cost less than paper-based instructions when patients are using their own smart devices.Implications for rehabilitationCosts are minimised when home exercise instructions are provided using the video function of the patient's own electronic devices compared with paper-based instructions.Since patient outcomes appear to be similar with instructions provided in electronic or paper-based mode, exercise instructions in community rehabilitation should be provided using the video function of electronic devices where these are available.
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32. **AAC apps for aphasia: a pilot study on the role of intuition and learning**

Nakkawita S. G., Duncan E. S., Hartzheim D. U. 2021

PURPOSE: To characterize the untrained performance of people with aphasia (PWA) in finding symbols (single words) on two symbol-based augmentative and alternative communication applications (AAC apps). METHOD(S): Nine individuals with aphasia and no previous experience with AAC searched for five symbols on two grid display apps with differing representation systems and vocabulary (Proloquo2Go and Speak for Yourself) following a brief demonstration. Participants were allowed two minutes to locate each symbol on each app (Trial 1), following which the process was repeated with the same symbols (Trial 2) for both apps. Measured variables included total number of symbols found as well as average efficiency score, search time per symbol, and number of cell selections per second for successful trials. Participants were interviewed about their stated app preferences. RESULT(S): In the absence of training, participants performed significantly better using Proloquo2Go for average search time ($p < .001$), and rate of cell selection ($p < .001$). No significant differences were found across trials. Seven of the nine participants expressed a preference for Proloquo2Go. CONCLUSION(S): Participant performance and stated preferences appeared to favour the layout found in Proloquo2Go, possibly suggestive of greater intuitiveness in the absence of training. However, significant learning was not observed across two trials, suggesting the importance of training and increased exposure.Implications for RehabilitationIndividuals who are diagnosed with aphasia may have long-term communication difficulties that require alternative means of communication.There are numerous commercially available augmentative and alternative communication applications (AAC apps) which may be beneficial for this population. However, there is limited research examining their usefulness.This study with a small sample of individuals with aphasia found that in the absence of training some apps may be easier to use than others.Additionally, the study found that learning may not occur in the absence of training highlighting the importance of treatment.
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33. **Autonomy-supportive treatment for acquired apraxia of speech: feasibility and therapeutic effect**

Haley K. L., Cunningham K. T., Kim I., Shafer J. S. 2021

Background: Most treatments for acquired apraxia of speech (AOS) rely on clinician-controlled practice conditions and repeated exposure to unimpaired speaker models. Recent motor learning research indicates that autonomy-support, expectation of competence, and external attentional focus may be more beneficial for motivation and skill learning. Aim(s): We evaluated the feasibility and basic therapeutic effect for the initial phase of a new speech production treatment program, ActionSC, that uses self-modeling and clinician coaching to help learners with AOS build their own practice program. Methods and Procedures: The single participant was a woman with moderate AOS and nonfluent aphasia. She met with project staff twice per week to review practice strategies, develop and adjust self-modeled video cues, work on her speech, and monitor progress. The program was structured around a custom app installed on a tablet computer. Most practice was directed by the participant based on options provided by the treating clinician. We used a multiple baseline across behavior design to evaluate the relationship between this treatment and oral reading probe performance for 30 conversational phrases the participant wanted to learn to say. Outcomes and Results: Experimental control was demonstrated, with target phrases remaining at baseline levels, then improving at the time treatment was introduced sequentially across three conversation topics. Effect sizes were moderate to large after 9-12 therapy sessions plus independent home practice. The participant assumed an active role in evaluating her own performance, administering and adjusting cues, and organizing her home practice. Conclusion(s): An autonomy-supportive and confidence-building format for speech practice can be feasible and effective for people with AOS. Fixed cueing hierarchies, augmented feedback, and attentional focus on speech movements may be less important in AOS treatment than previously thought. In addition to replicating our preliminary results with other participants and circumstances, there is a need to extend treatment development to later learning phases in order to promote positive change in real-life settings.
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34. **Development of a Concept for a Mobile Application to Support Orofacial Myofunctional Therapy**

Osen Christina, Litke Nicola, Wensing Michel, Weis Aline. 2021

Purpose: This study aimed to develop a concept for a mobile health application, an app-based exercise tool, to support the treatment of orofacial myofunctional disorders by speech-language therapists. Method: A sequential mixed research design combining qualitative research and user-centered software development was applied. Qualitative interviews and focus groups were conducted with eight speech-language therapists, one patient and three relatives to gather ideas for an app to support orofacial myofunctional therapy. On the basis of the findings, a paper-based prototype was developed, which was then evaluated by seven end users, to refine the concept of the app. Results: Qualitative data on desirable functionalities were clustered into topics and related subcategories containing general ideas for the app - a control mechanism, a reward system, the visualization of exercises, and pop-up messages for reminders and recommendations. The paper prototype was developed that addressed these functionalities. Discussion: An app-based exercise tool is considered to have added value for orofacial myofunctional therapy. A prototype for a mobile application is ready for programming and subsequent testing in the treatment of orofacial myofunctional disorders by conducting additional interviews to ascertain patients' perceptions.
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35. **Development of a Conversational Agent for Promoting Increased Activity in Users with Traumatic Brain Injury**
Rabinowitz A., Collier G. 2021
Research. Objectives: To develop and test a conversational agent-i.e. a chatbot that users communicate via text messaging-designed to augment behavioral activation treatment for reducing depression and increasing participation in individuals with moderate to severe Traumatic Brain Injury (TBI) called RehaBot. Design: A prototype of RehaBot was developed based on feedback from therapist and consumer focus groups and then tested in three separate user demonstration trials. A usability and preliminary efficacy trial is underway. Setting: Outpatient rehabilitation.ParticipantsRehabilitation providers and persons with moderate to severe TBI. Interventions: None.Main Outcome MeasuresSystem Usability Scale (SUS). Results: Therapist focus group participants indicated that RehaBot could promote engagement with therapeutic plans and provide prompts that cue users to adhere to routines. Respondents with TBI indicated that they would be comfortable interacting with RehaBot, and most had prior experience with chatbots. They expressed a preference for a system accessible via smartphone (vs. computer/voice assistant). Goal reminders, progress updates, and encouragement were identified as beneficial features. Respondents conveyed that misunderstandings between users and chatbots would be frustrating. In demonstration trials, two of the three participants could complete 5 of 5 RehaBot tasks independently. One user completed three independently and a 4th with assistance. The average SUS rating was 4.3 (0.80) on a 5-point scale. Conclusions: Preliminary evidence suggests that a chatbot augment to behavioral activation treatment-RehaBot-is acceptable and easy to use for persons with moderate to severe TBI. Further research is ongoing to establish usability in a larger sample and evaluate RehaBot's efficacy in improving therapeutic plan adherence.Author(s) DisclosuresNone.

36. **Digital Health and Digital Learning Experiences Across Speech-Language Pathology, Phoniatrics, and Otolaryngology: Interdisciplinary Survey Study**
Lin Yuchen, Lemos Martin, Neuschaefer-Rube Christiane. 2021
Background: Advances in digital health and digital learning are transforming the lives of patients, health care providers, and health professional students. In the interdisciplinary field of communication sciences and disorders (CSD), digital uptake and incorporation of digital topics and technologies into clinical training programs has lagged behind other medical fields. There is a need to understand professional and student experiences, opinions, and needs regarding digital health and learning topics so that effective strategies for implementation can be optimized. Objective: This cross-sectional survey study aims to interdisciplinarily investigate professional and student knowledge, use, attitudes, and preferences toward digital health and learning in the German-speaking population. Methods: An open-ended, web-based survey was developed and conducted with professionals and students in CSD including phoniatricians and otolaryngologists, speech-language pathologists (German: Logopäd*innen), medical students, and speech-language pathology students. Differences in knowledge, use, attitudes, and preferences across profession, generation, and years of experience were analyzed. Results: A total of 170 participants completed the survey. Respondents demonstrated greater familiarity with digital learning as opposed to eHealth concepts. Significant differences were noted across profession (P<.001), generation (P=.001), and years of experience (P<.001), which demonstrated that students and younger participants were less familiar with digital health terminology. Professional (P<.001) and generational differences were also found (P=.04) in knowledge of digital therapy tools, though no significant differences were found for digital learning tools. Participants primarily used computers, tablets, and mobile phones; non–eHealth-specific tools (eg, word processing and videoconferencing applications); and digital formats such as videos, web courses, and apps. Many indicated a desire for more interactive platforms, such as virtual reality. Significant differences were found across generations for positive views toward digitalization (P<.001) and across profession for feelings of preparedness (P=.04). Interestingly, across profession (P=.03), generation (P=.006), and years of experience (P=.01), students and younger participants demonstrated greater support for medical certification. Commonly reported areas of concern included technical difficulties, quality and validity of digital materials, data privacy, and social presence. Respondents tended to prefer blended learning, a limited to moderate level of interactivity, and time and space–flexible learning environments (63/170, 37.1%), with a notable proportion still preferring traditional time and space–dependent learning (49/170, 28.8%). Conclusions: This comprehensive investigation into the current state of CSD student and professional opinions and experiences has shown that incorporation of digital topics and skills into academic and professional development curricula will be crucial for ensuring that the field is prepared for the ever-digitalizing health care environment. Deeper empirical investigation into efficacy and acceptance of digital learning and practice strategies and systematic training and practical organizational supports must be planned to ensure adaptive education and practice.

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37. **Digital Learning in Speech-Language Pathology, Phoniatrics, and Otolaryngology: Interdisciplinary and Exploratory Analysis of Content, Organizing Structures, and Formats**
Lin Yuchen, Neuschaefer-Rube Christiane. 2021
Background: The digital revolution is rapidly transforming health care and clinical teaching and learning. Relative to other medical fields, the interdisciplinary fields of speech-language pathology (SLP), phoniatrics, and otolaryngology have been slower to take up digital tools for therapeutic, teaching, and learning purposes—a process that was recently expedited by the COVID-19 pandemic. Although many current teaching and learning tools have restricted or institution-only access, there are many openly accessible tools that have gone largely unexplored. To find, use, and evaluate such resources, it is important to be familiar with the structures,

concepts, and formats of existing digital tools. Objective: This descriptive study aims to investigate digital learning tools and resources in SLP, phoniatrics, and otolaryngology. Differences in content, learning goals, and digital formats between academic-level learners and clinical-professional learners are explored. Methods: A systematic search of generic and academic search engines (eg, Google and PubMed); the App Store; Google Play Store; and websites of established SLP, phoniatrics, and otolaryngology organizations was conducted. By using specific search terms and detailed inclusion and exclusion criteria, relevant digital resources were identified. These were organized and analyzed according to learner groups, content matter, learning goals and architectures, and digital formats. Results: Within- and between-learner group differences among 125 identified tools were investigated. In terms of content, the largest proportion of tools for academic-level learners pertained to anatomy and physiology (60/214, 28%), and that for clinical-professional learners pertained to diagnostic evaluation (47/185, 25.4%). Between groups, the largest differences were observed for anatomy and physiology (academic-level learners: 60/86, 70%; clinical-professional learners: 26/86, 30%) and professional issues (8/28, 29% vs 20/28, 71%). With regard to learning goals, most tools for academic-level learners targeted the performance of procedural skills (50/98, 51%), and those for clinical-professional learners targeted receptive information acquisition (44/62, 71%). Academic-level learners had more tools for supporting higher-level learning goals than clinical-professional learners, specifically tools for performing procedural skills (50/66, 76% vs 16/66, 24%) and strategic skills (8/10, 80% vs 2/10, 20%). Visual formats (eg, pictures or diagrams) were dominant across both learner groups. The greatest between-group differences were observed for interactive formats (45/66, 68% vs 21/66, 32%). Conclusions: This investigation provides initial insights into openly accessible tools across SLP, phoniatrics, and otolaryngology and their organizing structures. Digital tools in these fields addressed diverse content, although the tools for academic-level learners were greater in number, targeted higher-level learning goals, and had more interactive formats than those for clinical-professional learners. The crucial next steps include investigating the actual use of such tools in practice and students' and professionals' attitudes to better improve upon such tools and incorporate them into current and future learning milieus.

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38. **Effect of an iOS App on Voice Therapy Adherence and Motivation**

Leer Eva van, Lewis Brittney, Porcaro Nick. 2021

Purpose: Patients commonly report difficulties adhering to voice therapy. An iOS app was developed in our lab that assists practice via reminder notifications, instructional recordings, and cepstral peak prominence analysis results. The purpose of this study was to assess the effect of such homework support modality on adherence behavior and associated motivation in a comparison of app support and written homework instructions and to assess the usability and utility of the app. Method: Thirty-four individuals exhibiting adducted hyperfunction were randomized to receive either written homework instructions or the app when practicing resonant voice exercises for 3 weeks. All patients digitally audio recorded all home practice, provided self-reported estimates of generalization, and completed weekly motivation scales. Results: App support significantly increased practice frequency but did not affect self-reported generalization or motivation. Practice was significantly predicted by System Usability Scale scores. Utility of reminders and instructions were good, but cepstral peak prominence feedback was considered useful to only a subset of participants. Conclusion: Interactive mobile therapy support can significantly increase practice of resonant voice homework without influencing motivation.
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39. **Efficacy of Jellow app as an adjunct to stimulation therapy in improvement in language and quality of life in patients with chronic Broca's Aphasia**

Alam Noorain, Munjal Sanjay, Panda Naresh K., Kumar Raj, Gupta Shruti. 2021

Purpose: Stimulation approach is a therapy technique to improve language production using auditory and visual stimulation. Jellow app is a mobile app designed for compensating for impaired language skills and may be used in the intervention of persons with aphasia. The study aimed to determine the benefits of using the Jellow app as a facilitator of stimulus therapy to improve language and psychosocial domains in chronic Broca's Aphasia. Methods: Ten right-handed male adults with Broca's Aphasia were assessed on WAB and SIQOL39g tests. The control group (n = 5) was enrolled only for stimulation therapy. Pictures of objects were used for therapy with the help of auditory or auditory and visual cues. In the study group (n = 5), along with stimulus therapy, subjects were also trained on the use of icons in the Jellow app to facilitate functional communication needs. After six-months tests were readministered. Results: Post-therapy, on WAB, the improvement in spontaneous speech, repetition, and naming were found to be significantly more in the study group (4.6 +/- 0.55, 4.89 +/- 0.56, 5.74 +/- 0.24 respectively) than the control group (2.6 +/- 0.89, 3.22 +/- 0.49, 3.97 +/- 0.3 respectively) on 2-sample t-test. Similarly, significantly more improvement was seen in the communication domain of SAQOL39g in the study group (2.03 +/- 0.17) compared to the control group (1.14 +/- 0.45). Conclusion: Use of the Jellow app may be a beneficial adjunct to stimulation therapy for improving linguistic abilities and quality of life in persons with chronic Broca's aphasia.IMPLICATIONS FOR REHABILITATIONFollowing are the implications of this study in the rehabilitation of persons with chronic Broca's Aphasia:* Multimodality in therapy approach in traditional stimulation therapy is beneficial.* AAC Apps like the Jellow app can be used as an adjunct to the traditional stimulation approach of language intervention which facilitates the language abilities like spontaneous speech, repetition, and naming.* Language improvement due to rehabilitation is beneficial in improving the quality of life in this population.* The caregivers must be involved in the therapy program as they act as communication partners and

can repeat the therapy tasks at home.* Similar type of study is warranted in a larger population so that people with chronic Broca's aphasia may get the benefit of the latest technology which may be cheaper and easier to use.
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40. **Efficacy of spoken word comprehension therapy in patients with chronic aphasia: A cross-over randomised controlled trial with structural imaging**

Fleming V., Brownsett S., Krason A., Maegli M. A., Coley-Fisher H., Ong Y. -H, Nardo D., Leach R., Howard D., Robson H., Warburton E., Ashburner J., Price C. J., Crinion J. T., Leff A. P. 2021

Objective The efficacy of spoken language comprehension therapies for persons with aphasia remains equivocal. We investigated the efficacy of a self-led therapy app, a Listen-In', and examined the relation between brain structure and therapy response. Methods A cross-over randomised repeated measures trial with five testing time points (12-week intervals), conducted at the university or participants' homes, captured baseline (T 1), therapy (T 2 -T 4) and maintenance (T 5) effects. Participants with chronic poststroke aphasia and spoken language comprehension impairments completed consecutive Listen-In and standard care blocks (both 12 weeks with order randomised). Repeated measures analyses of variance compared change in spoken language comprehension on two co-primary outcomes over therapy versus standard care. Three structural MRI scans (T 2 -T 4) for each participant (subgroup, n=25) were analysed using cross-sectional and longitudinal voxel-based morphometry. Results Thirty-five participants completed, on average, 85 hours (IQR=70-100) of Listen-In (therapy first, n=18). The first study-specific co-primary outcome (Auditory Comprehension Test (ACT)) showed large and significant improvements for trained spoken words over therapy versus standard care (11%, Cohen's d=1.12). Gains were largely maintained at 12 and 24 weeks. There were no therapy effects on the second standardised co-primary outcome (Comprehensive Aphasia Test: Spoken Words and Sentences). Change on ACT trained words was associated with volume of pretherapy right hemisphere white matter and post-therapy grey matter tissue density changes in bilateral temporal lobes. Conclusions Individuals with chronic aphasia can improve their spoken word comprehension many years after stroke. Results contribute to hemispheric debates implicating the right hemisphere in therapy-driven language recovery. Listen-In will soon be available on GooglePlay. Trial registration number NCT02540889.
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41. **Enhancing Adherence to Voice Therapy via Social Cognitive Strategies**

van Leer Eva. 2021

Treatment adherence is a challenge in behavioral voice therapy. Patients commonly encounter difficulties with practicing and implementing target voice techniques outside of the clinic. Several mobile support strategies have been shown to improve adherence. These strategies are driven by social cognitive theory, which provides a theoretical but practical framework for understanding adherence behavior and solving adherence problems. Key features of the theory include (1) its model of triadic asymmetrical reciprocal causation, (2) the concept of human agency, and (3) the constructs of self-efficacy and goal commitment. The purpose of this article is to (1) explain voice therapy adherence within the framework of social cognitive theory, (2) illustrate three broad categories of adherence problems, and (3) provide examples of strategies to address each. With this exemplified knowledge, the clinician can diagnose factors that underlie patients' adherence problems and develop individualized solutions. Given the significant role adherence plays in behavioral interventions, this information holds substantial clinical relevance.
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42. **Experience Sampling and Programmed Intervention Method and System for Planning, Authoring, and Deploying Mobile Health Interventions: Design and Case Reports**

Bruna Carolina Rodrigues Cunha, Kamila Rios Da Hora Rodrigues, Zaine Isabela, Elias Adriano Nogueira da Silva, Viel Caio C.ésar, Maria Da Graça Campos Pimentel. 2021

Background: Health professionals initiating mobile health (mHealth) interventions may choose to adapt apps designed for other activities (eg, peer-to-peer communication) or to employ purpose-built apps specialized in the required intervention, or to exploit apps based on methods such as the experience sampling method (ESM). An alternative approach for professionals would be to create their own apps. While ESM-based methods offer important guidance, current systems do not expose their design at a level that promotes replicating, specializing, or extending their contributions. Thus, a twofold solution is required: a method that directs specialists in planning intervention programs themselves, and a model that guides specialists in adopting existing solutions and advises software developers on building new ones. Objective: The main objectives of this study are to design the Experience Sampling and Programmed Intervention Method (ESPIM), formulated toward supporting specialists in deploying mHealth interventions, and the ESPIM model, which guides health specialists in adopting existing solutions and advises software developers on how to build new ones. Another goal is to conceive and implement a software platform allowing specialists to be users who actually plan, create, and deploy interventions (ESPIM system). Methods: We conducted the design and evaluation of the ESPIM method and model alongside a software system comprising integrated web and mobile apps. A participatory design approach with stakeholders included early software prototype, predesign interviews with 12 health specialists, iterative design sustained by the software as an instance of the method’s conceptual model, support to 8 real case studies, and postdesign interviews. Results: The ESPIM comprises (1) a list of requirements for mHealth experience sampling and intervention-based methods and systems, (2) a 4-dimension planning framework, (3) a 7-step-based process, and (4) an ontology-based conceptual model. The ESPIM system encompasses web and mobile apps. Eight long-term case studies, involving professionals in psychology, gerontology, computer science, speech therapy, and occupational therapy, show that the method allowed specialists to be actual users who plan, create, and deploy interventions via the associated system. Specialists’ target users were parents of children diagnosed with autism spectrum disorder, older persons, graduate and undergraduate students, children (age 8-12), and caregivers of older persons. The specialists reported being able to create and conduct their own studies without modifying their original design. A qualitative evaluation of the ontology-based conceptual model showed its compliance to the functional requirements elicited. Conclusions: The ESPIM method succeeds in supporting specialists in planning, authoring, and deploying mobile-based intervention programs when employed via a software system designed and implemented according to its conceptual model. The ESPIM ontology–based conceptual model exposes the design of systems involving active or passive sampling interventions. Such exposure supports the evaluation, implementation, adaptation, or extension of new or existing systems.

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43. **Functional voice assessment and therapy methods supported by telepractice, voiceevalu8, and estill voice training**

Grillo E. U. 2021

Functional assessment and therapy methods are necessary for a client-centered approach that addresses the client's vocal needs across all environments. The purpose of this article is to present the approach with the intent to encourage discussion and implementation among educators, clinicians, researchers, and students. The functional approach is defined and its importance is described within the context of the World Health Organization's International Classification of Functioning, Disability, and Health with support provided by synchronous and asynchronous telepractice, the VoiceEvalU8 app, server, and web portal, and a framework that defines voice qualities (e.g., resonance, twang, loud, and others) by the anatomy and physiology of the voice production system (i.e., Estill Figures for Voice). Case scenarios are presented to highlight application of the functional voice approach. Copyright © 2020 Georg Thieme Verlag. All rights reserved.

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44. **Implementation and Effects of an Information Technology-Based Intervention to Support Speech and Language Therapy Among Stroke Patients With Aphasia: Protocol for a Virtual Randomized Controlled Trial**

Kim Esther S., Laird Laura, Wilson Carlee, Bieg Till, Mildner Philip, Möller Sebastian, Schatz Raimund, Schwarz Stephanie, Spang Robert, Voigt-Antons Jan, Rochon Elizabeth. 2021

BACKGROUNDMobile app-based therapies are increasingly being employed by speech-language pathologists in the rehabilitation of people with aphasia as adjuncts or substitutes for traditional in-person therapy approaches. These apps can increase the intensity of treatment and have resulted in meaningful outcomes across several domains.OBJECTIVEVoiceAdapt is a mobile therapy app designed with user and stakeholder feedback within a user-centered design framework. VoiceAdapt uses two evidence-based lexical retrieval treatments to help people with aphasia in improving their naming abilities through interactions with the app. The purpose of the randomized controlled trial (RCT) proposed here is to examine the feasibility and clinical efficacy of training with VoiceAdapt on the language and communication outcomes of people with aphasia.METHODSA multicenter RCT is being conducted at two locations within Canada. A total of 80 people with aphasia will be recruited to participate in a two-arm, waitlist-controlled, crossover group RCT. After baseline assessment, participants will be randomized into an intervention group or a waitlist control group. The intervention group participants will engage in 5 weeks of training with the app, followed by posttreatment and follow-up assessments after an additional 5 weeks. Those in the waitlist control group will have no training for 5 weeks; this is followed by pretreatment assessment, training for 5 weeks, and posttreatment assessment. All trial procedures are being conducted remotely given the COVID-19 pandemic.RESULTSRecruitment of participants started in September 2020, and the study is expected to be completed by March 2022. Publication of results is expected within 6 months of study completion.CONCLUSIONSThe results of the RCT will provide information on evidence-based practice using technology-based solutions to treat aphasia. If positive results are obtained from this RCT, the VoiceAdapt app can be recommended as an efficacious means of improving lexical retrieval and communicative functioning in people with aphasia in an easily accessible and a cost-effective manner. Moreover, the implementation of this RCT through remote assessment and delivery can provide information to therapists on telerehabilitation practices and monitoring of app-based home therapy programs.TRIAL REGISTRATIONClinicalTrials.gov NCT04108364.

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45. **iPad-based Apps to Facilitate Communication in Critically Ill Patients with Impaired Ability to Communicate: A Preclinical Analysis**

Dind Andrew J., Starr Joshua S., Arora Sumesh. 2021

Background: Inability to communicate is very distressing for patients in the intensive care unit (ICU). Most communication exchanges in ICU are initiated by healthcare workers (HCWs). Touch screen apps may enable patients to initiate communication and improve their interactions. Objectives: This study aimed to evaluate the pertinent features of iPad-based apps designed for communication in ICU. Methods: Apple "App Store" and Google "Play Store" were searched for keywords "communication" and "intensive care." Related app suggestions were screened. Two independent assessors evaluated iPad-based apps that were deemed useful. The assessors resolved the discrepancies by re-evaluating the apps and reaching a consensus. Results: Nine apps met the inclusion criteria. Of these six apps were free. There were seven apps specific to intensive care. Most apps had preloaded phrases for the patient to request to see someone (e.g., family), personal hygiene (e.g., bowel care), seek help with symptoms (e.g., pain), or a

comfort item (e.g., blanket). CALD Assist, Patient Communicator, VidaTalk, and YoDoc were available in more than eight languages. VidaTalk and YoDoc allowed the user to write. Four apps were deemed not suitable for routine ICU use, while the remaining five had several attractive features. Conclusion: Several high-quality apps are available to assist with patient-initiated communication exchange in ICU. This study provides a guide for readers to choose the app most suited to their needs. In the opinion of the authors, YoDoc is the most suitable app for routine use in ICU. Among free apps, CommuniCare appears to be the most user-friendly.
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46. **Korean Prosody Phrase Boundary Prediction Model for Speech Synthesis Service in Smart Healthcare**
Kim Minho, Jung Youngim, Kwon Hyuk-Chul. 2021
Speech processing technology has great potential in the medical field to provide beneficial solutions for both patients and doctors. Speech interfaces, represented by speech synthesis and speech recognition, can be used to transcribe medical documents, control medical devices, correct speech and hearing impairments, and assist the visually impaired. However, it is essential to predict prosody phrase boundaries for accurate natural speech synthesis. This study proposes a method to build a reliable learning corpus to train prosody boundary prediction models based on deep learning. In addition, we offer a way to generate a rule-based model that can predict the prosody boundary from the constructed corpus and use the result to train a deep learning-based model. As a result, we have built a coherent corpus, even though many workers have participated in its development. The estimated pairwise agreement of corpus annotations is between 0.7477 and 0.7916 and kappa coefficient (K) between 0.7057 and 0.7569. In addition, the deep learning-based model based on the rules obtained from the corpus showed a prediction accuracy of 78.57% for the three-level prosody phrase boundary, 87.33% for the two-level prosody phrase boundary.
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47. **Lessons Learned from Transitioning to Telerehabilitation During COVID-19 in Alberta, Canada...American Congress of Rehabilitation Medicine (ACRM) Annual Conference (Virtual), September 24–29, 2021**
Valevicius A.ïda, Ferguson-Pell Martin, Kershaw Christine, Vette Albert. 2021
To better understand rehabilitation practitioner experiences with transitioning to telerehabilitation services during COVID-19, specifically around the use of technology and client assessment and treatment. This was a qualitative study of cross-sectional design. Rehabilitation practitioners completed semi-structured interviews via Zoom. Transcribed interviews were analyzed for themes. With the onset of COVID-19, rehabilitation practitioners quickly adapted and started offering telerehabilitation services where they interacted directly with the client and evaluate, diagnose, and treat their condition virtually. These services differed from prior methods of telehealth, where healthcare practitioners delivered care from one healthcare facility to another. Practitioners from both public and private clinics shifted their services to virtual platforms quickly to provide continued care to patients needing acute and prolonged rehabilitation care. Twenty-four rehabilitation practitioners were recruited to participate in the study (14 physiotherapists, 4 occupational therapists, 2 speech language pathologists, 1 psychologist, 1 kinesiologist, 1 social worker, 1 orthopedic surgeon) from rural and urban clinics as well as private and publicly funded practices. Inclusion criteria required practitioners to have transitioned to telerehabilitation, either through video conferencing or telephone. N/A. N/A. The overarching theme which emerged from the data was providing continued access to care. Rehabilitation practitioners quickly transitioned to using the telephone or video conferencing platforms such as Zoom to connect with clients. Multiple subthemes emerged allowing for a better understanding of the transition to telerehabilitation during COVID-19. Barriers to offering telerehabilitation services included adequate access to technology (computer, laptop, tablet) and IT support for the client and sufficient internet bandwidth. Limited availability of validated virtual assessments made the transition difficult for practitioners. However, many benefits emerged such as easier scheduling of interdisciplinary meetings, increased client accountability, better access to group programming, and decreased travel times to clinics. Although there were challenges, especially surrounding technology, the switch to telerehabilitation had many benefits and could be a viable method of delivering care that goes beyond the COVID-19 pandemic. Authors have no conflicts of interest to disclose.
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48. **Listen up: it is time to integrate neuroscience and technologies into aphasia rehabilitation**
Lambon Ralph Matthew A. 2021
The study highlights four key developments in thinking and approach: (a) targeted therapy: although language is often referred to as a single entity, it actually reflects a collection of diverse activities (e.g., reading, listening, writing, speaking) that are supported by partially distinct brain networks and thus can be differentially affected after brain damage and may require targeted rehabilitation; (b) sufficient dose: as with any intervention, it is critical to know what minimal dosage is required to induce change. The average of 85 hours in this study is an order of magnitude larger than that included in previous ‘pragmatic’ trials based on the minimal therapy often funded in healthcare services and aligns with the necessary dosage identified in other studies4 6; (c) technology use: the ubiquitous use and availability of mobile devices means that there is a ready platform to deliver these higher-dosage therapies,5 freeing speech and language therapists to use their advanced expertise to hone, evaluate and direct each patient’s intervention and maintenance package and (d) neuroscience foundations: there is a surprising dearth of information about the neural and cognitive underpinnings of therapy.7–9 Fleming et al make important new contributions by exploring how patients’ therapy gain related to both pretherapy brain structures and post-therapy changes. The Fleming et al’s study will also energise other critical future advances in the field: (a) mechanistic accounts of language impairments and rehabilitation: in comparison to the wealth of clinical aphasiological custom and

practice, formal mechanistic neurocognitive accounts of language activities, information on how these are affected by brain dysfunctions or damage, and how rehabilitation influences these systems are only beginning to emerge10–12; (b) big data: the adoption of online therapy apps not only permits a step change in dose delivery but also heralds the potential for big data studies in neurorehabilitation sciences and c) prediction modelling: going beyond the interesting outcome–brain associations identified by Fleming et al, big data will also allow researchers to build and test formal models that predict therapy outcome from combinations of social, biomedical, cognitive and neural information—thereby offering sophisticated stratification approaches and a gateway to neuroscience-led 'precision' speech and language therapy.13 Contributors MALR wrote the editorial.
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49. **Online conversation groups within an inpatient stroke setting**
Warburton A., Gilpin L. 2021
Introduction: To minimise the spread of Covid-19, face to face interactions were reduced and inpatient communication group therapy sessions are paused. This results in fewer opportunities to work on therapy goals and practice communication skills. Communication therapy via telerehabiliation improves quality of life, reduces aphasia severity and increases social connectedness1; however the feasibility and impact of online group therapy in an acute inpatient setting is unknown. Method(s): Twice weekly online conversation groups were established on the stroke unit. The groups aim to provide targeted speech and language therapy (SLT) and opportunity for patients to interact, learn from peers and share experiences. Three patients attend each session run by one Speech and Language Therapist via Zoom on tablets. Conversations are facilitated using pictures and visual prompts. Mood measures (Anxiety Scale Circles and Depression Intensity Scale Circles) and communication confidence self-rating scales are completed and amount of therapy sessions, minutes of therapy received and attendance at group therapy pre and post implementation is recorded. Result(s): Data collection will be completed in September, with full results to follow. Preliminary results indicate: feasibility and patient acceptance of online groups and increased number of communication therapy and group sessions, thus increasing the intensity of input for communication impairments. Conclusion(s): This quality improvement project seeks to determine the feasibility and acceptability of online conversation groups in an inpatient setting, with the aim of reducing the impact of social distancing on therapy and interactions. Success will lead to an increase in direct SLT and improved communication confidence in patients. Complications.
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50. **Outcome of speech and language therapy clinical dysphagia assessment following an interdisciplinary swall owscreen**
Maher J., Ryan S., King L., Sayers K., Donnellan C., Pillay I. 2021
Background: A 7 question non-validated swallow screen (Any reported swallowing difficulties? Any coughing with food or fluids? Any choking?Does food get stuck when eating? Any recurrent chest infections? Any pain when swallowing? Any difficulty swallowing tablets?) is used by an integrated care team for older persons to prioritise referrals to the Speech and Language Therapy (SLT) service. This study identified the proportion of patients screened who appropriately required a clinical dysphagia assessment and intervention. Method(s): This was a retrospective study from September 2020 to June 2021. Patients were assessed by the Clinical Specialist SLT who determined if swallow impairment was present and whether intervention was required. Age, gender and clinical frailty score were documented. Patients who resided out of the catchment area or who had already received an SLT service were excluded. Result(s): The average age was 80 years, range 67-103. The male to female ratio was 2:1 and the average clinical frailty score (CFS) was 5.N=42(32%) screened positive. N=29(69%) attended for SLT assessment. N=27(93.1%) had a swallow impairment identified. N=20 were discharged following a single intervention and 9 required further SLT intervention. Conclusion(s): Presbyphagia is generally asymptomatic and results from age related anatomical and physiological changes, reduced functional reserve and sarcopenia. Older adults compensate for these difficulties and do not seek assistance. Presbyphagia may progress to dysphagia, resulting in adverse outcomes. The high rate of SLT confirmed swallow impairment and need for SLT intervention highlights a need to prospectively refine and validate this 7 question swallow screen.
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51. **Speech Therapy Apps Using the Example of neolexon: Challenges in Entering the Healthcare Sector and Opportunities for Therapists and Patients**
Jakob H., Spath M. 2021
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52. **Tablet-Based Telerehabilitation Versus Conventional Face-to-Face Rehabilitation After Cochlear Implantation: Prospective Intervention Pilot Study**
Völter Christiane, Stöckmann Carolin, Schirmer Christiane, Dazert Stefan. 2021
BACKGROUNDTechnologies allowing home-based rehabilitation may be a key means of saving financial resources while also facilitating people's access to treatment. After cochlear implantation, auditory training is necessary for the brain to adapt to new auditory signals transmitted by the cochlear implant (CI). To date, auditory training is conducted in a face-to-face setting at a specialized center. However, because of the COVID-19 pandemic's impact on health care, the need for new therapeutic settings has intensified.OBJECTIVEThe aims of this study are to assess the feasibility of a novel teletherapeutic auditory rehabilitation platform in

adult CI recipients and compare the clinical outcomes and economic benefits of this platform with those derived from conventional face-to-face rehabilitation settings in a clinic.METHODSIn total, 20 experienced adult CI users with a mean age of 59.4 (SD 16.3) years participated in the study. They completed 3 weeks of standard (face-to-face) therapy, followed by 3 weeks of computer-based auditory training (CBAT) at home. Participants were assessed at three intervals: before face-to-face therapy, after face-to-face therapy, and after CBAT. The primary outcomes were speech understanding in quiet and noisy conditions. The secondary outcomes were the usability of the CBAT system, the participants' subjective rating of their own listening abilities, and the time required for completing face-to-face and CBAT sessions for CI users and therapists.RESULTSGreater benefits were observed after CBAT than after standard therapy in nearly all speech outcome measures. Significant improvements were found in sentence comprehension in noise (P=.004), speech tracking (P=.004) and phoneme differentiation (vowels: P=.001; consonants: P=.02) after CBAT. Only speech tracking improved significantly after conventional therapy (P=.007). The program's usability was judged to be high: only 2 of 20 participants could not imagine using the program without support. The different features of the training platform were rated as high. Cost analysis showed a cost difference in favor of CBAT: therapists spent 120 minutes per week face-to-face and 30 minutes per week on computer-based sessions. For CI users, attending standard therapy required an average of approximately 78 (SD 58.6) minutes of travel time per appointment.CONCLUSIONSThe proposed teletherapeutic approach for hearing rehabilitation enables good clinical outcomes while saving time for CI users and clinicians. The promising speech understanding results might be due to the high satisfaction of users with the CBAT program. Teletherapy might offer a cost-effective solution to address the lack of human resources in health care as well as the global challenge of current or future pandemics.
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53. **Tele-Rehabilitation to Combat Rehabilitation Service Disruption During COVID-19 in Hong Kong: Observational Study**

Ku Benny Pang Shing, Tse Ada Wai Shan, Pang Benny Chu Hang, Cheung Ngai Tseung, Pang Joanna Yuk Wa, Chan Joyce Ka Yin, Hui Hing Loi, Chu Dave, Choi Kevin Hoi Wa. 2021

BACKGROUNDA tele-rehabilitation platform was developed to improve access to ambulatory rehabilitation services in Hong Kong. The development was completed in October 2019 and rolled out for use to occupational therapists, physiotherapists, and speech therapists. During the COVID-19 pandemic, rehabilitation services were severely interrupted. Tele-rehabilitation was used extensively to meet the demand for rehabilitation service delivery.OBJECTIVEThe aims of this study were to (1) describe the design and development process of a tele-rehabilitation service, and (2) study how the tele-rehabilitation platform was used to overcome the disruption of rehabilitation service during the COVID-19 pandemic.METHODSTele-rehabilitation was developed utilizing 4 core determinants of Unified Theory of Acceptance and Use of Technology as guiding principles. A generic prescription platform, called the activity-based prescription system, and a mobile app, called the Rehabilitation App, were built. Five outcomes were used to examine the utilization of tele-rehabilitation both before and during the pandemic: throughput, patient demographic, patient conditions, workforce, and satisfaction from patients and staff.RESULTSThere was a tremendous increase in the use of tele-rehabilitation during pandemic. The total number of patients (up until July 2020) was 9101, and the main age range was between 51 to 70 years old. Tele-rehabilitation was used for a much wider scope of patient conditions than originally planned. More than 1112 therapists, which constituted 50.6% of the total workforce (1112/2196), prescribed tele-rehabilitation to their patients. Moreover, there was a high satisfaction rate from patients, with a mean rating of 4.2 out of 5, and a high adherence rate to prescribed rehabilitation activities (107840/131995, 81.7%).CONCLUSIONSThe findings of our study suggested that tele-rehabilitation in the form of a generic prescription platform and mobile app can be an effective means to provide rehabilitation to patient. During the COVID-19 pandemic, tele-rehabilitation has been used extensively and effectively to mitigate service disruption. Our findings also provide support that there is a high level of satisfaction with tele-rehabilitation; however, a longer duration study is required to demonstrate the sustained use of tele-rehabilitation, especially after the pandemic.
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54. **Teletherapy startups work to gain credibility as payers, employers sign on: As more mental health and digital therapeutics startups enter the market, experts say payers must demand that these businesses compete to be in their networks based on patient outcomes and return on investment**

Tepper Nona. 2021

Because the fine-dining restaurant where Engleman works does not offer insurance, she paid $275 per month for access to a Talkspace therapist. Despite the dearth of independent studies, insurers, employers and government customers are turning to these startups as a way to meet heightened consumer demand and improve employee retention, said Adam Block, a health economist and assistant professor at New York Medical College. ...]because large-scale, independent studies comparing the efficacy of these programs do not yet exist, Block said payers are deciding which app to add in-network based on startups' user experience, the number and credentialing of their providers, ability to integrate with their existing technology systems, and price. Hirschorn credited the company's technology platform with attracting business customers, saying it allows health plans real-time access to patient care and referral data, along with provider training, certification and credentialing.
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o+be+in+their+networks+based+on+patient+outcomes+and+return+on+investment&volume=51&issue=20&spage=24&date=2021&doi=&sid=ProQuest this link

55. **The Arthur App Designing an augmentative and alternative communication method for use with hospitalized patients**
Fowler S. B., Foley J. T., Degroot K., Geddie P. I. 2021
An innovative augmentative and alternative communication method consisting of a mobile application (app) on an Apple iPad, such as the Arthur app, can provide patients with barriers to verbal communication an easy means to express their needs, feelings, and questions. When using this technology, it is important to consider the right patient population at the right time, as well as the proper quantity and quality of information. Copyright © 2022 by the Oncology Nursing Society.
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56. **The feasibility, usability and acceptability of a tablet-based aphasia therapy in the acute phase following stroke**
De Cock Elien, Batens Katja, Feiken Judith, Hemelsoet Dimitri, Oostra Kristine, De Herdt Veerle. 2021
Question: Independent practice via an application with a language exercise program for aphasia, as an add-on to conventional care can be a good solution to intensify aphasia therapy. The aim of this prospective trial was to investigate the feasibility, usability and acceptability of the newly-developed aphasia exercise program in the 'Speech Therapy App (STAPP)' in the acute phase post-stroke. Methods: All eligible people with aphasia following stroke (< 2 weeks post-stroke) admitted to the Stroke Unit of Ghent University Hospital were recruited in this prospective clinical trial between September 2018 and December 2019. After linguistic assessments and two short training sessions, participants were asked to practice independently with 'STAPP' for at least 30 min/day during hospitalization. Exercises were individually tailored and adjusted if necessary. Outcome was measured by recruitment, adherence and retention rates, usability questionnaires and a visual analogue scale for satisfaction. Results: Twenty-five (mean age 65 years (SD = 17), 14 females) of 31 eligible people with aphasia were enrolled in this trial (recruitment rate = 81 %). All participants but one (23/24) practiced with the language app until the end of hospitalization (retention rate = 96 %). Ten participants practiced at least 30 min/day (adherence rate = 42 %). Participants reported they learned to work quickly with the app (92 %; agreed/totally agreed), the app was easy to use (88 %), they could work independently (79 %), practiced their language (67 %) and wanted to continue working with the app at home (79 %). Acceptability was high (median satisfaction rate 91 %; IQR = 75–100). Conclusion: The aphasia exercise program in 'STAPP' is feasible to use as an additional rehabilitation tool along with standard of care in the acute phase post-stroke. Further research is needed to assess the efficacy. (PsycInfo Database Record (c) 2021 APA, all rights reserved) (Source: journal abstract)
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57. **The use and impact of a supported aphasia-friendly photo menu tool on iPads in the inpatient hospital setting: a pilot study**
Francis K., Swan K., Rose T., Hopper M., Hopper Z., Hughes I., Lawrie M., Wenke R. 2021
Background: People with aphasia (PWA) may have difficulty accessing information in their environment, including the hospital setting. Prior research has recommended the use of aphasia-friendly text-formatting principles, including using graphics when providing information to PWA. There is limited research into the impact of using such principles for hospital menus. Aim(s): To evaluate the impact of an aphasia-friendly menu with assistance from a Speech Pathology Therapy Assistant (SPTA) compared with usual hospital menus in PWA on 1) oral intake, 2) self-reported involvement and 3) ease in meal ordering and 4) meal preference. The secondary aim was to investigate the feasibility of implementing the aphasia-friendly menu by exploring staff and caregiver experiences regarding the perceived barriers and facilitators to its implementation, along with time required to assist PWA to order meals. Methods and procedures: This embedded mixed-methods design study was piloted at two hospitals in Queensland, Australia. Hospital inpatients with aphasia due to non-progressive neurological damage, their caregivers and SPTAs participated. Each day PWA received either the 1) aphasia-friendly menu: professional photos of menu items on an iPad with SPTA support, or 2) usual hospital menus provided in random order for up to 15 days during their inpatient stay. Each day, oral intake was measured and PWA rated their perceived involvement and ease with ordering from the menu provided on a 10-point Likert scale. SPTAs recorded time assisted using the menus and reported barriers and facilitators to the use of the menus daily. At the completion of the pilot, the PWA's preferred menu type was recorded, SPTAs participated in a focus group and caregivers completed a questionnaire. Outcomes and results: There was no significant difference in oral intake between menu types. PWA rated the aphasia-friendly menu more favourably for involvement ($p = 0.004$) and ease ($p = 0.015$) when ordering. Nineteen out of 20 PWA who provided a response preferred the aphasia-friendly menu ($p = 4 \times 10\text{-}5$). SPTA comments were analysed using qualitative content analysis and outlined their perceived barriers and facilitators to the use of aphasia-friendly menus, experience with usual menus and recommendations for future directions. Meal ordering was approximately 4.4 minutes longer with PWA using the aphasia-friendly menus. Conclusion(s): The aphasia-friendly menu was positively perceived by PWA, caregivers and SPTAs and may be a viable and preferred option for PWA when ordering food in hospitals. Staff are encouraged to consider the contextual barriers and facilitators identified in the pilot, prior to implementation of such aphasia-friendly menus.Copyright © 2019 Informa UK Limited, trading as Taylor & Francis Group.
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58. **Use of an app as a complementary strategy to speech-language therapy in a case of cognitive-communication disorder**
Silva M. C. S. C., Almeida B. P. B., Barreto S. D. S. 2021
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59. **Use of an iPad App (Aid for Decision-making in Occupational Choice) for Collaborative Goal Setting in Interprofessional Rehabilitation: Qualitative Descriptive Study**
Strubbia Carla, Levack William Mm, Grainger Rebecca, Takahashi Kayoko, Tomori Kounosuke. 2021

BACKGROUNDGoal setting is a key part of the rehabilitation process. The use of technology and electronic tools such as smartphone apps and websites has been suggested as a way of improving the engagement of users in meaningful goal setting and facilitating shared decision-making between patients and health professionals.OBJECTIVEThis study aims to describe experiences of health professionals and patients in the use of the English language version of the iPad app Aid for Decision-making in Occupational Choice (ADOC) to facilitate collaborative goal setting in rehabilitation.METHODSWe recruited participants from 3 acute and postacute care rehabilitation wards in both public and private organizations in New Zealand. Participants were registered allied health professionals, including physiotherapists, occupational therapists, and speech-language therapists, who engage in goal setting as part of their normal work, and their adult patients. We collected data via semistructured interviews to gather information about the experiences of the participants in the use of ADOC for goal setting. Data were analyzed with thematic analysis.RESULTSA total of 8 health professionals and 8 patients participated in the study. Six main themes emerged from the data: changing patients' perspective on what is possible, changing health professionals' perspective on what is important, facilitating shared decision-making, lack of guides for users, logistic and organizational barriers, and app-related and technical issues.CONCLUSIONSHealth professionals and patients found ADOC to be a valuable tool when setting shared rehabilitation goals. The use of ADOC promoted a patient-centered approach that empowered patients to engage in collaborative goal setting. The technological limitations of the app that negatively impacted experiences can be addressed in the future implementation of ADOC in rehabilitation settings.
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60. **VidaTalk™ patient communication application "opened up" communication between nonvocal ICU patients and their family**

Shin Ji Won, Happ Mary Beth, Tate Judith A. 2021

To explore family members' perceptions of an electronic communication application, VidaTalk™, their communication experience, and emotional reactions to communication with mechanically ventilated patients in the intensive care units. Qualitative phase of a mixed-methods study nested within a randomised controlled trial. Family members in the intervention group received the VidaTalk™ app as a communication aid during their intensive care stay. Seven family members participated in 18 semi-structured email interviews after discharge between May and December 2018. Interviews were analysed using qualitative content analysis. Families were recruited in multiple intensive care units located in one university hospital. Communication experience with the VidaTalk™ and emotions while communicating with the patient. Basic qualitative description and constant comparative techniques were used to code and analyse the text using ATLAS_ti (Version 7.5.18). The VidaTalk™ opened up family-patient communication by allowing clear communication and expanding communication content. Family members felt happy and thankful to communicate with the patient. They also expressed feelings of relief and less frustration and less stress while communicating with the patient. On the other hand, the patient's ability to express their worries or anxiety sometimes made families feel sad or distressed. The VidaTalk™ was helpful for family-patient communication. The VidaTalk™ may help families reduce psychological distress. However, expanded communication with critically ill patients may cause other negative feelings.
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61. **Voice therapy for Parkinson's disease via smartphone videoconference in Malaysia: A preliminary study**

Chan Min Yen, Chu Shin Ying, Ahmad Kartini, Ibrahim Norlinah Mohamed. 2021

Introduction: Intensive voice therapy is one of the best evidence-based treatments to improve speech and voice difficulties to individuals with Parkinson's disease (PD). However, accessibility to intensive voice therapy is highly challenging in Malaysia due to the lack of voice specialised speech-language therapists. This study examined the feasibility of using smartphone videoconference to deliver intensive voice therapy to individuals with PD in Malaysia.Methods: Intensive voice therapy was delivered to 11 adults with PD using a smartphone videoconference method via WhatsApp Messenger freeware. The therapy consisted of 12 sessions over four weeks and focused on increasing vocal loudness. Outcomes were assessed using objective, perceptual and quality-of-life measures pre and post treatment. Participant satisfaction with the telerehabilitation method was obtained via the Smartphone-Based Therapy Satisfaction Questionnaire.Results: Significant gains were reported for sound pressure level in sustained vowels and monologue. Perceptual ratings showed significant improvements in overall mean severity and loudness after treatment. Mean scores of speech intelligibility and Voice Handicap Index-10 were significantly better post treatment. Overall, participants were highly satisfied with the smartphone videoconference method.Discussion: Present results suggest that the smartphone videoconference method is feasible to deliver intensive voice therapy to individuals with PD to gain better speech and voice functions. Future studies need to address the standardisation of the system protocol to optimise this novel service delivery method in Malaysia.
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62. **A Phase II Randomized, Virtual, Clinical Trial of Speech Therapy App for Speech, Language, and Cognitive Intervention in Stroke**

Braley M., De Oliveira E., Munsell M., Anantha V., Pierce J., Kiran S., Lakhan S. 2020

Research Objectives: To assess change in post-stroke aphasia severity using an in-home, cognitive-linguistic digital therapeutic versus standard of care. Design(s): Phase II, virtual, randomized, controlled trial, comparing Speech Therapy (ST) App, a FDA Breakthrough Device, versus Workbook (active-control) for post-stroke aphasia. Setting(s): Fully decentralized/remote. Participant(s): 36 adult subjects >4 months post-stroke aphasia were randomized (n=18 ST App, n=18 Workbook). Four subjects withdrew, 1 due to a non-treatment emergent adverse event (stroke). There were 32 completers per-protocol (n=17 ST App, n=15 Workbook). Intervention(s): Participants were instructed to use the randomized intervention for at least 30 minutes per day, 5 days per week for a treatment duration of 10 weeks. Main Outcome Measure(s): Change in WAB-AQ at 10 weeks compared to baseline. Result(s): There was a mean improvement on WAB-AQ of 7.10 with ST App vs. 0.52 with Workbook (CI: 2.54, 10.62]; p=0.001; linear mixed effects model). Accounting for age and time since stroke as fixed effects, ST App had a mean improvement in WAB-AQ of 6.64 relative to Workbook (CI: 2.454, 10.818]; p=0.002). There were also significant improvements in secondary endpoints with ST App vs. Workbook

for WAB Language Quotient (5.21 vs. 0.63, CI: 1.44, 7.72, p=0.004) and WAB Cortical Quotient (5.74 vs. 0.86, CI: 1.67, 8.09], p=0.003). Conclusion(s): Use of ST App was associated with a statistically significant and clinically meaningful improvement in speech, language, and cognitive abilities over standard of care. These findings suggest that ST App may be used for digital aphasia rehabilitation for stroke patients discharged from in-person speech-language therapy. Further studies are needed to validate these findings. Author(s) Disclosures: Financial: -Michelle Braley, Michael Munsell, Veera Anantha, Emily De Oliveira, and Shaheen Lakhan are employees of The Learning Corp, the makers of Speech Therapy (ST) App and Constant Therapy -Jordyn Pierce and Swathi Kiran are scientific consultants of The Learning Corp, the makers of Speech Therapy (ST) App and Constant Therapy. Non-financial: There are no relevant non-financial relationships to disclose. Keywords: Technology, Stroke, Aphasia, Telerehabilitation, TelehealthCopyright © 2020

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63. **An epidemiological profile of dysarthria incidence and assistive technology use in the living population of people with MND in Scotland**

Elliott Elizabeth, Newton Judith, Rewaj Phillipa, Gregory Jenna M., Tomarelli Lynda, Colville Shuna, Chandran Siddharthan, Pal Suvankar. 2020

Objectives: People with motor neurone disease (pwMND) experience communication impairments due to speech and motor dysfunction. Communication support in the form of Augmentative and Alternative Communication (AAC) in conjunction with Assistive Technology (AT) access methods are available, however, variation in provision care pathways exists across Scotland. We conducted a baseline study of communication support for pwMND in Scotland to inform and improve future service provision. Methods: A cross-sectional population-based study was undertaken. Anonymised demographic and clinical phenotypic data for all pwMND in Scotland were extracted from the Care Audit Research Evaluation of MND (CARE-MND) platform, the National MND Register for Scotland. Additional information for AT loans was provided by the third sector charitable organization MND Scotland (MNDS). Results: In total, 371 pwMND were included, 43% of all pwMND were recorded as having impaired speech (recent ALSFRS-R score assessment Formula: see text]3) and 69% had been referred to Speech and Language Therapist (SLT) services, although there was variation in referral time from diagnosis date. AAC equipment had been acquired by 17.3% of all pwMND; most commonly iPads and the LightwriterTM speech generating device. Conclusions: Our data highlight a high prevalence of speech impairment in pwMND irrespective of the subtype diagnosis. We therefore recommend standardized care pathways and earlier access to coordinated SLT and Occupational Therapist services to enable prospective and personalized decision making. Our findings further highlight the need for qualitative research to understand the preferences and impact of such interventions from the perspective of the user and their communication partners.

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64. **Aphasia after acute stroke in a prospective, randomized, clinical controlled noninvasive study with an ipad-based app (Neolexon): Study protocol of the lexi study**

Thunstedt D. C., Young P., Kupper C., Mu ller K., Becker R., Erbert F., Lehner K., Rheinwald M., Pfahler A., Dieterich M., Kellert L., Feil K. 2020

Background and Aims: Treatment of aphasia is still challenging for physicians, speech and language therapists and patients. So far there is proven evidence for traditional language therapy. However, digital age potentially offers the opportunity to work more efficiently and cost-effectively. Neolexonis a commercial tablet-based software for treatment of aphasia. In the Lexi study, we aim to determine whether treatment with Neolexonis superior to standard therapy in acute post-stroke aphasia. Method(s): A sample size of 140 patients, 70 for each group will be included. Prospective, randomized, parallel group, open-label, clinical and experimental controlled non-invasive trial. Adult German native speakers suffering from acute aphasia after stroke are included. Computer-generated, blocked and stratified randomization by aphasia severity will assign patients to one of two groups: either 4 weeks of standard logopedic treatment vs. logopedic treatment with Neolexonadditionally. Both groups will also have self-training. Severity of aphasia will be assessed using the Bielefelder Aphasie Screening (BIAS), Aphasia Bedside Test (AABT) and Aphasia Check List (ACL). Follow-up will be assessed after 3 months. Result(s): The primary endpoint is defined as a significant difference between aphasia severity comparing the two groups. Differences in quality of life, Beck Depression Inventory (BDI) and modified Ranking Scale (mRS) will we evaluated as secondary outcome parameters. Conclusion(s): This trial will determine whether Neolexonis superior to standard logopedic therapy alone. Subgroups with the greatest response to Neolexonwill be described.

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65. **Challenges of virtual talking therapies for substance misuse in New Zealand during the COVID-19 pandemic: an opinion piece**

Galea-Singer Susanna, Newcombe David, Farnsworth-Grodd Virginia, Sheridan Janie, Adams Peter, Walker Natalie. 2020

The COVID-19 pandemic requires us to rethink how virtual approaches might work for people who use alcohol and other drugs. Are virtual clinics only suitable for clients with whom clinicians have already formed a therapeutic relationship? How well would virtual clinics work for new clients presenting to services, for clients in acute distress, and for those with complex problems? Addressing the sustained change required to maintain substance-free lives or a safe substance-use life requires robust psychotherapeutic approaches, which have traditionally been delivered through physical contact, whether they are one-to-one or group-based interventions. The challenge during this time of the COVID-19 pandemic is to deliver effective talking therapies while avoiding physical contact. How then should services continue to offer counselling and support in such an environment? How can we learn from the COVID-19 situation to deliver treatment to individuals who may have difficulties attending traditional clinic-based care, such as those in more rural areas with transport difficulties? This article focuses on identifying practical issues and providing some solutions.

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https://media.proquest.com/media/hms/PFT/1/Z38cG?_a=ChgyMDIzMDMwODExNTYxNzQwMjo5MTI5NzQSBTc5MTY3GgpPTkVfU0VBUkNIIg01LjE0OC4xMzUuMTg2KgcxMDU2MzM1MgoyNDA4ODM3NDczOg1Eb2N1bWVudEltYWdlQgEwUgZPbmxpbmVaAkZUYgNQRlRqCjIwMjAvMDUvMjJyCjIwMjAvMDUvMjJ6AIIBM1AtMTAwNzA2Ny0xNDY0NTQtQ1VTVE9NRVItMTAwMDAyNzAvMTAwMDAxNTUtNTg5MTc2NZIBBk9ubGluZcoBgQFNb3ppbGxhLzUuMCAoV2luZG93cyBOVCAxMC4wOyBXaW42NDsgeDY0KSBBcHBsZVdlYktpdC81MzcuMzYgKEtIVE1MLCBsaWtlIEdlY2tvKSBDaHJvbWUvMTEwLjAuMC4wIFNhZmFyaS81MzcuMzYgRWRnLzExMC4wLjE1ODcuNjPSARJTY2hvbGFybHkgSm91cm5hbHOaAgdQcmVQYWlkqgIrT1M6RU1TLU1IZGlhTGlua3NTZXJ2aWNlLWdIdE1IZGlhVXJsRm9ySXRlbcoCD0FydGljbGV8RmVhdHVyZdICAVnyAgD6AgFOggMDV2ViigMcQ0lEOjIwMjMwMzA4MTE1NjE3NDAyOjMxMzgzNw%3D%3D&_s=%2F2tymMPh6jwr1kP%2BvyPI%2B802HJM%3D this link

66. **Correction: Mobile Apps for Speech-Language Therapy in Adults With Communication Disorders: Review of Content and Quality**

Vaezipour Atiyeh, Campbell Jessica, Theodoros Deborah, Russell Trevor. 2020

This corrects the article DOI: 10.2196/18858.]

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67. **Early digital rehabilitation program for hospitalized COVID-19 patients**

Tamir Y. A., Cialic R., Barak O. 2020

Introduction: The COVID-19 pandemic presented us with unique challenges. COVID-19 patients are prone to develop severe respiratory failure and debilitating deconditioning. In addition, COVID-19 patients are physically and socially isolated. The care of these patients necessitate innovative approach. We present a model, based on combined digital and hands-on tool, designed to provide early comprehensive rehabilitation for isolated patients. Method(s): Bites © is a digital platform for sharing video-based interactive presentations. We used Bites to create a collection of education and training videos encompassing various biopsychosocial domains. These videos are sent to the patient via smart phone, enabling to deliver content tailored to the patient needs. A multidisciplinary based protocol directs the usage of this platform in an earlyrehabilitation program, comprised of digital and hands-on interventions. Result(s): We created a collection of professional education and training videos in the following fields: Medicine, Physiotherapy, Occupational therapy, Nutrition, Social Services, Speech therapy. As the epidemic curve in the country was successfully flattened, the large scale implementation of the program was not executed. Accounting for the high likelihood of a second COVID-19 wave, the potential for this early rehabilitation tool is high. Key conclusions: The special situation of isolated and deconditioned patients presents a unique challenge. Implementation of an early combined digital/hand-on rehabilitation program can improve the well-being and outcomes of those who can participate in such a program. The program is currently under adjustment to be used to provide early rehabilitation in the non-COVID-19 hospitalized patients and in the post-hospital period as well.

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68. **Effect of AAC technology with dynamic text on the single-word recognition of adults with intellectual and developmental disabilities**

Holyfield Christine, Light Janice, Mcnaughton David, Caron Jessica, Drager Kathryn, Pope Lauramarie. 2020

Purpose: Single-word recognition can support participation in life, including engagement in leisure activities, navigation through the community, and vocational opportunities. Given the limited reading skills of many adults with intellectual and developmental disabilities (IDD) and limited speech, the current study evaluated the effects of using an augmentative and alternative communication (AAC) app, featuring dynamic text and speech output embedded in visual scene displays, on the single-word recognition performance of six adults with IDD who demonstrated limited speech. Method: A multiple baseline across participants single-subject design was used. Ten target sight words for each participant were selected on an individual basis, based on participant interest. Intervention consisted solely of interactions between investigators and individual participants using the app. Result: In the absence of any formal instruction and solely through the use of the AAC app interaction, three of the six participants demonstrated increased accuracy in single-word recognition. Conclusion: Results from the study were mixed, but suggest that AAC apps which provide the dynamic display of text in conjunction with voice output can assist some adults with IDD in achieving gains in single-word reading.

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69. **Erratum: Correction: Mobile Apps for Speech-Language Therapy in Adults With Communication Disorders: Review of Content and Quality (JMIR mHealth and uHealth (2020) 8 10 (e18858))**

Vaezipour A., Campbell J., Theodoros D., Russell T. 2020

This corrects the article DOI: 10.2196/18858.].

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70. **Follow-Up in Aphasia Caused by Acute Stroke in a Prospective, Randomized, Clinical, and Experimental Controlled Noninvasive Study With an iPad-Based App (Neolexon R): Study Protocol of the Lexi Study**

Thunstedt Dennis C., Young Peter, Kupper Clemens, Muller Katharina, Becker Regina, Erbert Franziska, Lehner Katharina, Rheinwald Marika, Pfahler Angelika, Dieterich Marianne, Kellert Lars, Feil Katharina. 2020

Rationale: Treatment of aphasia is still challenging for clinicians and patients. So far, there is proven evidence for "face-to-face" speech therapy. However, the digital age potentially offers new and complementary strategies that may add to treatment outcome in a cost-effective way. Neolexon R is a commercial tablet-based software for treatment of aphasia, which can be applied with the help of a therapist or as self-training by the patient. Aims and hypothesis: In the Lexi study, we aim to determine whether treatment with Neolexon R is superior to standard therapy in acute post-stroke aphasia. Sample size estimates: A sample size of 180 patients, 90 for each group, will be included with an assumed dropout rate of ~20%. Methods and design: Prospective, randomized, parallel group, open-label, blinded-endpoint clinical, and experimental controlled non-invasive trial (PROBE). Adult German native speakers with

acute aphasia after stroke are included. Computer-generated, blocked, and stratified randomization by aphasia severity will assign patients to one of two groups: 4 weeks of either standard logopedic speech therapy or logopedic speech therapy with the app version of Neolexon R. Both groups will be instructed in self-training: the frequency and duration of self-training will be documented. Screening for aphasia will be performed using the Language Screening Test (LAST). The severity of aphasia in general and in subitems will be assessed using the Bielefelder Aphasie Screening (BIAS) and the Aphasia Check List (ACL). Follow-up will be assessed after 3 months. Study outcomes: Based on the consensus in our study team, we considered a 10% mean difference in the change of percentile rank (PR) of BIAS to be a minimal and clinically important difference. The primary endpoint is defined as a significant difference in BIAS comparing the two groups. Differences in quality of life, Beck Depression Inventory (BDI), and modified Ranking Scale (mRS) will be evaluated as secondary outcome parameters. Discussion: This trial will determine whether speech therapy with the use of Neolexon R is superior to standard logopedic therapy. Subgroups with the greatest response to Neolexon R will be described. The trial was prospectively registered on the "EU Clinical Trials Register" (NCT04080817). Copyright © 2020 Thunstedt, Young, Kupper, Muller, Becker, Erbert, Lehner, Rheinwald, Pfahler, Dieterich, Kellert and Feil.
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71. **Improvement in functional vocabulary and generalization to conversation following a self-administered treatment using a smart tablet in primary progressive aphasia**

Lavoie Monica, Bier Nathalie, Laforce Robert, Macoir Joël, Laforce Robert Jr. 2020

Currently, public services in speech-language pathology for primary progressive aphasia (PPA) are very limited, although several interventions have been shown to be effective. In this context, new technologies have the potential to enable people with PPA to improve their communication skills. The main aim of this study was to investigate the efficacy of a self-administered therapy using a smart tablet to improve naming of functional words and to assess generalization to an ecological conversation task. Five adults with PPA completed the protocol. Using an ABA design with multiple baselines, naming performance was compared across four equivalent lists: (1) trained with functional words; (2) trained with words from a picture database; (3) exposed but not trained; and (4) not exposed (control). Treatment was self-administered four times a week for a period of four consecutive weeks. A significant improvement for trained words was found in all five participants, and gains were maintained two months post-treatment in four of them. Moreover, in three participants, evidence of generalization was found in conversation. This study supports the efficacy of using a smart tablet to improve naming in PPA and suggests the possibility of generalization to an ecological context.
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72. **Incorporating discriminative stimuli into functional communication training with augmentative and alternative communication devices: a tutorial**

Mitteer Daniel R., Randall Kayla R., Van Winkle Leslie J., Greer Brian D. 2020

Functional communication training (FCT) is a commonly used and effective treatment for problem behavior maintained by social reinforcement (e.g., an individual engages in self-injurious behavior to gain access to adult attention). FCT involves teaching an individual to emit an appropriate communication response to access the reinforcer maintaining problem behavior (e.g., pressing a "Play, please" symbol on a device to gain the communication partner's attention) and withholding that reinforcer following problem behavior (e.g., the communication partner minimizes attention-following problem behavior and waits for a communication response). Techniques such as incorporating discriminative stimuli (e.g., differently colored cards) can make FCT more practical for caregivers by teaching individuals when reinforcement is and is not available for communication responses while simultaneously mitigating treatment relapse. Despite the effectiveness of FCT with discriminative stimuli, no studies have leveraged the capabilities of augmentative and alternative communication (AAC) devices by embedding discriminative stimuli within AAC software (e.g., by coloring communication symbols or grids). Our tutorial provides a comprehensive overview of how practitioners can incorporate FCT with discriminative stimuli into practice and includes video models of how to design these treatments on two common AAC apps.
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73. **Investigating a new tablet-based telerehabilitation app in patients with aphasia: a randomised, controlled, evaluator-blinded, multicentre trial protocol**

Uslu Arif Sinan, Gerber Stephan M., Schmidt Nadine, Röthlisberger Carina, Wyss Patric, Vanbellingen Tim, Schaller Sandra, Wyss Corina, Koenig-Bruhin Monica, Berger Thomas, Nyffeler Thomas, Müri René, Nef Tobias, Urwyler Prabitha. 2020

INTRODUCTIONAphasia is a common language disorder acquired after stroke that reduces the quality of life of affected patients. The impairment is frequently accompanied by a deficit in cognitive functions. The state-of-the-art therapy is speech and language therapy but recent findings highlight positive effects of high-frequency therapy. Telerehabilitation has the potential to enable high-frequency therapy for patients at home. This study investigates the effects of high-frequency telerehabilitation speech and language therapy (teleSLT) on language functions in outpatients with aphasia compared with telerehabilitative cognitive training. We hypothesise that patients training with high-frequency teleSLT will show higher improvement in language functions and quality of life compared with patients with high-frequency tele-rehabilitative cognitive training (teleCT).METHODS AND ANALYSISThis study is a randomised controlled, evaluator-blinded multicentre superiority trial comparing the outcomes following either high-frequency teleSLT or teleCT. A total of 100 outpatients with aphasia will be recruited and assigned in a 1:1 ratio stratified by trial site and severity of impairment to one of two parallel groups. Both groups will train over a period of 4 weeks for 2 hours per day. Patients in the experimental condition will devote 80% of their training time to teleSLT and the remaining 20% (24 min/day) to teleCT, vice versa for patients in the control condition. The primary outcome measure is the understandability of verbal communication on the Amsterdam Nijmegen Everyday Language Test and secondary outcome measures are intelligibility of the verbal communication, impairment of receptive and expressive language functions, confrontation naming. Other outcomes measures are quality of life and acceptance (usability and subjective experience) of the teleSLT system.ETHICS AND DISSEMINATIONThis study is approved by the Ethics Committee Bern (ID 2016-01577). Results will be submitted to a peer-reviewed journal.TRIAL REGISTRATION NUMBERNCT03228264.
https://libkey.io/libraries/2762/openurl?genre=article&au=Uslu%2C+Arif+Sinan%3BGerber%2C+Stephan+M%3BSchmidt%2C+Nadine%3BR%C3%B6thlisberger%2C+Carina%3BWyss%2C+Patric%3BVanbellingen%2C+Tim%3BSchaller%2C+Sandra%3BWyss%2C+Corina%3BKoenig-Bruhin%2C+Monica%3BBerger%2C+Thomas%3BNyffeler%2C+Thomas%3BM%C3%BCri%2C+Ren%C3%A9%3BNef%2C+Tobias%3BUrwyler%2C+Prabitha&aulast=Uslu&issn=2044-6055&isbn=&title=Investigating+a+new+tablet-based+telerehabilitation+app+in+patients+with+aphasia%3A+a+randomised%2C+controlled%2C+evaluator-blinded%2C+multicentre+tria

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74. **Mainstream technology to support basic communication and leisure in people with neurological disorders, motor impairment and lack of speech**

Lancioni Giulio E., Singh Nirbhay N., O'Reilly Mark F., Sigafoos Jeff, D'Amico Fiora, Buonocunto Francesca, Lanzilotti Crocefissa, Alberti Gloria, Navarro Jorge. 2020

To assess a simple technology solution to support basic communication and leisure in people with neurological disorders, extensive motor impairment, and absence of speech. The design was a non-concurrent multiple baseline across participants. The study included eight participants and assessed a technology setup including a Samsung Galaxy Tab S2 LTE tablet and a Samsung Galaxy A3 smartphone. The smartphone, automated via MacroDroid, presented the participant with leisure, messages, and caregiver options. Choosing leisure or messages (by activating the smartphone's proximity sensor) led the smartphone to present the alternatives available for that option and eventually verbalize the alternative selected. This verbalization triggered the tablet's Google Assistant and led the tablet to present a leisure event or start a message exchange. Choosing the caregiver led the smartphone to invite the caregiver to interact with the participant. During baseline (i.e., when a standard smartphone was available), the participants did not activate any of the options. During intervention and post-intervention (i.e., with the technology described above), participants activated all options and spent most of the session time positively engaged with them. The aforementioned technology seems to be a useful tool for individuals like those involved in this study.

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75. **Real-Time Acoustic Voice Analysis Using a Handheld Device Running Android Operating System**

Fujimura Shintaro, Kojima Tsuyoshi, Okanoue Yusuke, Kagoshima Hiroki, Taguchi Atsushi, Shoji Kazuhiko, Inoue Masato, Hori Ryusuke. 2020

We developed a highly accessible acoustic voice analysis system (VArt) using a handheld device running Android operating system. To provide stable and reliable analysis using readily obtainable equipment under unfavorable conditions, we modified the fundamental frequency (F0) extraction algorithm and designed an intuitive user interface representing a new hoarseness index (real-time Ra: Rart), which is a derivative of harmonics-to-noise ratio developed by Kojima and Shoji (Ra2). Since Rart continues to display analysis results in real time, unlike conventional acoustic analysis, it can be used for evaluation such as during phonosurgery and speech therapy. We evaluated the agreement between the earlier version of acoustic voice analysis software (VA) running on a Windows personal computer and VArt running on a handheld device. F0, Ra2 , and Rart were measured in voice samples of sustained vowel phonation /a/ from 10 healthy volunteers and 22 patients with voice disorders using VA running on a Windows personal computer and VArt running on two types of handheld devices in a sound-treated room or in a medical examination room. Intraclass correlation coefficients were calculated for both systems under both conditions. All of the comparisons were highly correlated. Measurements obtained using our newly developed VArt were highly consistent with those using VA, indicating high reliability. Moreover, the new system increases the clinical feasibility of acoustic voice analysis.

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76. **staRt: Enhancing Speech Treatment With Smartphone-delivered Biofeedback**

Anon. 2020

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77. **Stroke Speech Therapy App Gains Breakthrough Tag**

Alan. 2020

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78. **Study protocol for a randomized controlled trial: Prophylactic swallowing exercises in head-and-neck cancer patients treated with (Chemo) radiotherapy**

Baudelet M., Van Den Steen L., Duprez F., Goeleven A., Nuyts S., Nevens D., Verstraete H., Vauterin T., Van Nuffelen G. 2020

Introduction: Dysphagia is a common and serious complication after (chemo)radiotherapy (CRT) for head-and-neck cancer (HNC) patients. Prophylactic swallowing exercises (PSE) can have a significant positive effect on post-treatment swallowing function. However, low adherence rates are a key issue in undermining this positive effect. This randomized trial will investigate the effect of adherence improving measures on patients' swallowing function, adherence and Quality of Life (QOL). Material(s) and Method(s): This ongoing trial explores the difference in adherence and swallowing related outcome variables during and after PSE in HNC patients performing the same therapy schedule, receiving different methods of delivery. One hundred fifty patients treated in various hospitals are divided into three groups. Group 1 performs PSE at home, group 2 practices at home with continuous counseling of an app and group 3 receives face-to-face therapy by a speech-and-language pathologist. Figure 1 summarizes the differences between the groups. The exercises consist of tongue strengthening exercises and chin tuck against resistance with effortful swallow. The Iowa Oral Performance Instrument and the Swallowing Exercise Aid are used for practicing. Patients are evaluated before, during and after treatment by means of strength measurements, swallowing and QOLquestionnaires. Figure 2 shows the outline of the study. Discussion(s): Since low adherence rates undermine the positive impact of PSE on post-treatment swallowing function, there is need to develop an efficient PSE protocol which maximizes the adherence rates. It is expected that this study will result in an optimized, patient supported and evidence based PSE-program improving patient compliance.

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79. **The Application of Lexical Retrieval Training in Tablet-Based Speech-Language Intervention**

Gallee J., Pittmann R., Pennington S., Vallila-Rohter S. 2020

In the setting of shortened hospitalization periods, periods of confinement and social isolation, limited resources, and accessibility, technology can be leveraged to enhance opportunities for rehabilitative care (1). In the current manuscript, we focus on the use of tablet-based rehabilitation for individuals with aphasia, a language disorder that frequently arises post-stroke. Aphasia treatment that

targets naming through effortful and errorful instances of lexical retrieval, where corrective feedback is generated on every trial, may enhance retention and generalizability of gains (2, 3). This pilot evaluation explored how six individuals with aphasia interacted with a tablet-based therapy application that targeted lexical retrieval. Participants with aphasia either (1) autonomously engaged with the therapy tasks or (2) received systematic encouragement to effortfully retrieve words. Behaviors of response latency and cue use were examined to gain insights into the behavioral patterns of both groups, as well as analyses of task accuracy and outcomes on standardized cognitive-linguistic assessments. Despite some variability, initial observations suggest that participants who received systematic training refrained from using cues to complete tasks and spent longer on each trial, which ultimately co-occurred with increased independent engagement with therapy and improved standardized outcomes. Preliminary results present an alternative means of leveraging technology to implement best-practice recommendations in the context of aphasia telerehabilitation.
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http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed21&NEWS=N&AN=633537260 this link

80. **The Current State and Future Possibilities of Mobile Phone "Voice Analyser" Applications, in Relation to Otorhinolaryngology**

Munnings Amberley Jade. 2020

BACKGROUND: A large proportion of the population suffers from voice disorders. The use of mobile phone technology in healthcare is increasing, and this includes applications that can analyze voice., OBJECTIVE: This study aimed to review the potential for voice analyzer applications to aid the management of voice disorders., METHODS: A literature search was conducted yielding eight studies which were further analyzed., RESULTS: Seven out of the eight studies concluded that smartphone assessments were comparable to current techniques. Nevertheless there remained some common issues with using applications such as; voice parameters used; voice pathology tested; smartphone software consistency and microphone specifications., CONCLUSIONS: It is clear that further developments are required before a mobile application can be used widely in voice analysis. However, promising results have been obtained thus far, and the benefits of mobile technology in this field, particularly in voice rehabilitation, warrant further research into its widespread implementation.
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81. **Utility of apps in speech and language therapy**

Abhishek B. P., Almudhi Abdulaziz Saleh. 2020

Communication is the behaviour that makes human social being, thus, demarcating human communication from the form of communication adapted by other species in general. However, this behaviour seems to be meaningful when the sender transmits a message through icons, non-verbal gestures or verbal mode and those messages conveyed should be understood with ease by the receiver. Technologies (Apps) have revolutionized health care professionals, due to their widespread effects in the field of communication disorders. Apps can be used for all communication disorders. Apps can be classified as native apps, the utility apps and hybrid apps, based on the development. Apps can also be classified under five different categories based on their utility: lifestyle mobile apps, social media apps, pre-installed apps, entertainment apps and productivity based apps. The utility of apps has been extended to the field of speech-language pathology (SLP). Numerous apps have been used by both parents/caregivers of children with speech-language problems as well as the SLPs. Parents may use it to complement therapy and for at-home training while an SLP uses it for various purposes such as stimulus presentation, demonstrating a technique and providing feedback to their clients. (Source: chapter)
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82. **Virtual reality in speech and language therapy: Requirement for the use of virtual reality in aphasiatherapy-a practical approach**

Detter-Biesl D., Schwartz B. 2020

Background and Aims: In chronic aphasia, high training intensity for the rehabilitation of language abilities is essential. The use of software applications (apps) can be an opportunity to increase exercise frequency and monitor patients' home-based training. Currently many apps mainly offer exercises at the functional level only. To promote functional aspects in communications, requirements for virtual reality applications in aphasia therapy were developed. The aim of this joint project (FFG grant number: 870751, industry partner: Rewellio GmbH) was to identify the basic requirements for Virtual Reality (VR) in speech and language therapy. Method(s): Unsystematic literature reviews and talks with speech therapists were performed. Result(s): In the area of interaction, the auditive stimuli must be offered on both ears in a realistically manner. The VR-environment should offer realistic and behaviourally relevant situations and the avatar should be able to simulate communicative features in daily conversation situations. Assistance and achievements should be offered in order to maintaining motivation and tasks should invite and motivate the patient to start an activity. In the area of immersion, a distraction-free environment with individual therapeutic stimuli and everyday scenes (i.e. pragmatic all-day connection promotes mental networking) should be implemented. Conclusion(s): There is a potential of VR being used in language rehabilitation therapies. The development should focus on different usage scenarios (e.g. priming tool, language comprehension setting, pragmatic communicative setting) in order to develop meaningful applications and generate research-relevant data. Therefore, the collaboration of different professionals is essential to ensure guideline-based speech therapy.
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83. **'Alexa, Call my SLP'**

WILLIAMSON FELICIA. 2019

The article discusses the benefits of smart assistant technology to persons with speech and language disorders. Topics discussed include the case story of a 15-year-old boy with cerebral palsy who uses smart-assistant technology, main areas in which to use smart assistants with augmentative and alternative communication (AAC), and tips and tricks when using smart assistant and AAC system.
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84. **A tablet-based home practice program paired with telepractice promotes maintenance and learning of objects and actions in individuals with chronic aphasia**
Grasso Stephanie M., Henry Maya L. 2019
https://libkey.io/libraries/2762/openurl?genre=article&au=Grasso%2C+Stephanie+M%3BHenry%2C+Maya+L&aulast=Grasso&issn=17489539&isbn=&title=A+tablet-based+home+practice+program+paired+with+telepractice+promotes+maintenance+and+learning+of+objects+and+actions+in+individuals+with+chronic+aphasia&jtitle=Evidence+Based+Communication+Assessment+and+Intervention&pubname=Evidence+Based+Communication+Assessment+and+Intervention&btitle=&atitle=A+tablet-based+home+practice+program+paired+with+telepractice+promotes+maintenance+and+learning+of+objects+and+actions+in+individuals+with+chronic+aphasia&volume=13&issue=3&spage=171&date=2019&doi=10.1080%2F17489539.2019.1624052&sid=ProQuest this link
85. **Clinical approach in following up Speech Therapy of patients suffering from Respiratory Sleep Disorders**
Bertolini M. M., De Conti D. I. 2019
Introduction: Patients (P) with OSA motivated by disturbing their partners with loud snoring (LS) and gagging during sleep, searched for speech therapy (ST). It is frequently questioned if these P will maintain the muscle and functional results obtained during the therapy. Aim(s): To demonstrate the effciency of Orofacial Myofunctional Therapy (OMT) in maintaining obtained results in P with OSA and complaints of LS. Method(s): Four adult P, both sexes, ages between 39 -67 years old diagnosticated via PSG with moderate and severe OSA, snoring complaints (SC), which refused CPAP and were referred by ORL underwent 3 months of OMT, having weekly sessions and training three times a day. These P were followed up during one year after the therapy (4 re-evaluations) and monitored by the app SnoreLab (SL), partner's feedback, and photography. We applied MGBR protocol on OSA, added by thong positioning in relation to the palate, genioglossus (G) tone, mobility and contraction of soft palate (SP) and uvula (U). Result(s): We observed that all cases the OMT had long-lasting results maintaining the increased pharynx muscle contraction with elevation of SP and U and also maintained the movability and built of the G muscle gained by exercises. Three exercises and orofacial functions (OFFs) were preserved. Excessive daytime sleepiness (EDS) was eliminated and neck circumference decreased more than 1cm. Two female, post-menopause aged, went through PSG after OMT, in one case a 29.2/h AHI were normalized, in the other the 70.9/h AHI decreased to 31.2/h leading to the use of a Mandibular Advancement Device (MAD). In the frst case, the S was associated with shifting to supine position during sleep. The results shows that OMT was very effective in normalize and decrease OSA and regulate sleep effectiveness and phases. The two men, of the same age, had general improvement especially in the PF to a signifcant decrease in S. One was referred to combined treatment with MAD. In all Ps, there was a signifcant decrease in the frequency (F) and intensity (I) of S. Conclusion(s): The clinical follow-up of patients with OSA and presence of S, after three months of OMT conducting three daily exercises and OFFs, confrms the effectiveness of the therapy in maintaining long-lasting mobility and strength of the pharyngeal muscles and decreasing snoring I and F and the signs and symptoms of OSA. The OMT provided better quality of life for the patients.
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86. **Design of the PERSPECTIVE study: PERsonalized SPEeCh Therapy for actIVE conversation**
Maas J., De Vries N., Bloem B., Kalf H. 2019
Background: Speech problems in Parkinson's disease (PD) have a profound negative impact on social interaction and quality of life. Current speech treatment is, overall highly intensive and therefore not suitable for patients in all disease stages. Evidence for these highly intensive programs is growing, but still inconclusive because of small sample sizes, a lack of outcomes relevant for patients and short term follow-up. To address these challenges, we will perform a large-scale study to demonstrate the efficacy of speech therapy in PD on quality of life and speech, using personalized and homebased (remote) speech therapy, supported by a dedicated speech training app. We expect that home-based treatment will make speech therapy more available for patients in all disease stages. We also expect the personalized component and dedicated app to augment the efficacy of the treatment, and to improve the compliance of both patients and their caregivers. Method(s): We will perform a single blind, randomized controlled trial, comparing 8 weeks of speech therapy through telerehabilitation to no intervention using a waiting list design. 215 participants with idiopathic PD in all disease stages with problems in intelligibility are recruited by 12 participating specialized speech therapists. All patients will be measured at baseline and after 8 weeks. The experimental group will receive a follow-up measurement after a wash-out period of 24 weeks. The control group will receive deferred treatment after 8 weeks, but no additional follow-up assessments. The primary outcome is quality of life. Secondary outcomes are speech and voice quality, intelligibility, severity of voice and speech complaints, and caregiver burden. Discussion(s): This study will be the first to investigate the efficacy of speech therapy in PD in all disease stages on a large scale, using a sufficient follow-up and outcomes that are relevant for patients.
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87. **Efficacy of a self-administered treatment using a smart tablet to improve functional vocabulary in post-stroke aphasia: a case-series study**
Lavoie Monica, Bier Nathalie, Macoir Joel. 2019
BACKGROUND: Aphasia is an acquired language disorder that occurs secondary to brain injury, such as stroke. It causes communication difficulties that have a significant impact on quality of life and social relationships. Although the efficacy of speech-language therapy has been clearly demonstrated in this population, long-term services are currently limited due to logistical and financial constraints. In this context, the potential contribution of technology, such as smart tablets, is worth exploring, especially to improve vocabulary that is relevant in daily life., AIMS: The main aim was to investigate the efficacy of a self-administered treatment using a smart tablet to improve naming of functional words in post-stroke anomia., METHODS & PROCEDURES: Four adults with post-stroke aphasia took part in the study. An ABA design with multiple baselines was used to compare naming performances for four equivalent lists: (1) trained with functional words chosen with the participant; (2) trained with words randomly chosen from a picture database; (3) exposed but not trained; and (4) not exposed (control)., OUTCOMES & RESULTS: For all participants, the treatment self-administered at home (four times/week for 4 weeks) resulted in a significant improvement for both sets of trained words that was maintained 2 months after the end of treatment. Moreover, in two participants, evidence of generalization to conversation was found., CONCLUSIONS & IMPLICATIONS: This study confirms the efficacy of using smart tablets to improve naming in post-stroke aphasia. Although more studies are needed, the use of new technologies is unquestionably a promising approach to improve communication skills in people with aphasia, especially by targeting vocabulary that is relevant to them in their daily lives.

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88. **Feasibility of Automatic Speech Recognition for Providing Feedback During Tablet-Based Treatment for Apraxia of Speech Plus Aphasia**

Ballard Kirrie J., Etter Nicole M., Shen Songjia, Monroe Penelope, Chek Tien Tan. 2019

Purpose: Individuals with neurogenic speech disorders require ongoing therapeutic support to achieve functional communication goals. Alternative methods for service delivery, such as tablet-based speech therapy applications, may help bridge the gap and bring therapeutic interventions to the patient in an engaging way. The purpose of this study was to evaluate an iPad-based speech therapy app that uses automatic speech recognition (ASR) software to provide feedback on speech accuracy to determine the ASR's accuracy against human judgment and whether participants' speech improved with this ASR-based feedback. Method: Five participants with apraxia of speech plus aphasia secondary to stroke completed an intensive 4-week at-home therapy program using a novel word training app with built-in ASR. Multiple baselines across participants and behaviors designs were employed, with weekly probes and follow-up at 1 month posttreatment. Four sessions a week of 100 practice trials each were prescribed, with 1 being clinician-run and the remainder done independently. Dependent variables of interest were ASR-human agreement on accuracy during practice trials and human-judged word production accuracy over time in probes. Also, user experience surveys were completed immediately posttreatment. Results: ASR-human agreement on accuracy averaged ~80%, which is a common threshold applied for interrater agreement. All participants demonstrated improved word production accuracy over time with the ASR-based feedback and maintenance of gains after 1 month. All participants reported enjoying using the app with support of a speech pathologist. Conclusion: For these participants with apraxia of speech plus aphasia due to stroke, satisfactory gains were made in word production accuracy with an app-based therapy program providing ASR-based feedback on accuracy. Findings support further testing of this ASR-based approach as a supplement to clinician-run sessions to assist clients with similar profiles in achieving higher amount and intensity of practice as well as empowering them to manage their own therapy program.

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89. **Feasibility of the Fake Phone Call: An iOS App for Covert, Public Practice of Voice Technique for Generalization Training**

van Leer Eva, Porcaro Nick. 2019

Generalization is a challenging phase in voice therapy, involving the implementation of a targeted voice technique in all spoken communication. Among other barriers to generalization, self-consciousness keeps patients from practicing and recalibrating their voice technique when they can be overheard (eg, at work). We developed an iOS application that covertly assists users in producing their target voice while they appear to be engaged in a cellular phone call. To examine the feasibility of this Fake Phone Call, 11 adults in the generalization stage of voice therapy received a simulated call four times daily for 1 week. Usability, utility, and preliminary efficacy of the application were assessed via triangulated measures including self-report scales, a semistructured interview, and perceptual voice quality assessment of each completed phone call. Results indicated good feasibility, usability, and utility of the Fake Phone Call in eliciting target voice practice in public without bystander detection of the call's simulated nature. Preliminary efficacy data suggested a positive effect on vocal self-evaluation skill. The Fake Phone Call and comparable mobile strategies hold potential to facilitate covert public practice and generalization of a speaking-voice technique.

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90. **How Well Do We Use Our Technology? Examining iPad Navigation Skills in Individuals With Aphasia and Older Adults**

Sitren Amanda, Vallila-Rohter Sofia. 2019

Purpose: Technology is increasingly being used in rehabilitation, yet exposure and comfort with technology varies across individuals, particularly among older adults. There are limited ways to evaluate comfort with technology or teach people how to use technological devices. The objective of the current study was to develop an iPad task battery and evaluate performance by individuals with aphasia and older adults, further examining whether participants could learn to improve performance with written, verbal, and visual instructions. Method: Thirty-two participants completed this study (16 with poststroke aphasia and 16 older adult controls). Participants completed 3 phases of testing: (a) baseline evaluation of performance of an iPad task battery, (b) teaching and practice of unknown tasks, and (c) retention evaluation. Participants were scored on accuracy, speed, and efficiency in each phase. Results were evaluated as a function of demographic and cognitive-linguistic variables. Results: Results demonstrate that variability arises in people's abilities to perform tasks on an iPad and that cognitive skills such as executive functions, planning, and visuospatial attention relate to baseline scores of performance. The majority of participants with aphasia showed evidence of retaining information learned in the teaching and practice phase; however, they showed a lower percentage of retained lessons relative to controls. Conclusions: Findings support the hypothesis that technology abilities vary among individuals with and without aphasia. Evaluating technology ability and the ability to learn technology is an important component to consider when prescribing tablet-based therapies.

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https://media.proquest.com/media/hms/PFT/1/dkICD?_a=ChgyMDIzMDMwODExNTYxNzQwMjo5MTI5NzQSBTc5MTY3GgpPTkVfU0VBUkNIIg01LjE0OC4xMzUuMTg2KgYxMzUzNTMyCjIzMzkxNDI4NTk6DURvY3VtZW50SW1hZ2VCATBSBk9ubGluZVoCRlRiA1BGVGoKMjAxOS8xMS8wMXIKMjAxOS8xMS8zMHoAggEzUC0xMDA3MDY3LTE0NjQ1NC1DVVNUT01FUi0xMDAwMDI3MC8xMDAwMDE1NS01ODkxNzY1kgEGT25saW5lygGBAU1vemlsbGEvNS4wIChXaW5kb3dzIE5UIDEwLjA7IFdpbjY0OyB4NjQpIEFwcGxlV2ViS2l0LzUzNy4zNiAoS0hUTUwsIGxpa2UgR2Vja28pIENocm9tZS8xMTAuMC4wLjAgU2FmYXJpLzUzNy4zNiBFZGcvMTEwLjAuMTU4Ny42M9IBElNjaG9sYXJseSBKb3VybmFsc5oCB1ByZVBhaWSgAitPUzpFTVMtTWVkaWFMaW5rc1NlcnZpY2UtZ2V0TWVkaWFVcmxGb3JJdGVtygIPQXJ0aWNsZXxGZWF0dXJl0gIBWfICAPoCAU6CAwNXZWKKAxxDSUQ6MjAyMzAzMDgxMTU2MTc0MDI6MzEzODM3&_s=bhEwWJC11p8zGlqEJ1YXYtTWAB8%3D this link

91. **Hybrid Telecoaching for Corporate Speech Training and Potential Applications to Clinical Practice**
Burke III Thomas F. 2019
Purpose: The purpose of this article was to describe a model for "hybrid speech telecoaching" developed for a Fortune 100 organization and offer a "thought starter" on how clinicians might think of applying these corporate strategies within future clinical practice. Conclusion: The author contends in this article that corporate telecommunications and best practices gleaned from software development engineering teams can lend credibility to e-mail, messaging apps, phone calls, or other emerging technology as viable means of hybrid telepractice delivery models and offer ideas about the future of more scalable speech-language pathology services.
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92. **Implementation and evaluation of an integrated hospital-to-home transitional care intervention for older adults with stroke and multimorbidity: a feasibility study**
Reid Maureen, Valaitis Ruta, Bartholomew Amy, Fisher Kathryn, Fleck Rebecca, Ploeg Jenny, Salerno Jennifer, Thabane Lehana, Gafni Amiram, Archer Norman. 2019
Introduction: Stroke is the leading cause of death and adult disability in Canada. Up to 80% of older adults (>65 years) who have suffered a stroke will return to their homes, and 60% will require ongoing rehabilitation in the community. The transition between hospital and home is very challenging, particularly for those with comorbidities. Little is known about the core elements for successful care transitions specifically for older adults with stroke and comorbidities. New, integrated interventions are needed to provide quality transitional care from hospital-to-home to reduce hospital readmissions and optimize transition outcomes for this vulnerable population. Theory/Methods: This studyused a single-site one-group pre-test/post-test design. Participants were recruited from a hospital-based outpatient stroke rehabilitation centre in Ontario, Canada. Eligible participants were >55 years with a confirmed diagnosis of stroke in the past 12 months, had > 2 comorbidities, referred to a hospital-based outpatient stroke rehabilitation centre, and community-dwelling. The intervention was a 6-month transitional care intervention delivered by an interprofessional (IP) team (Occupational therapist, Physiotherapist, Speech Language Pathologist, Registered Nurse, Social Worker). It involved care coordination, self-management education and support, home visits, telephone contacts, interprofessional case conferences, and a web-based app. The primary focus of the study was the feasibility of the intervention, which was determined based on information from interviews with providers, managers, and patients. Effectiveness of the intervention was of secondary interest in our study and was based on the 6- month change in health outcomes (health-related quality of life, depression, anxiety, self-efficacy), provider experience, and cost. Results: In total, 30 (59%) of 51 eligible persons consented to participate. Of these, 25 (83%) completed the 6-month follow-up. Participants were an average of 71.3 years and had an average of 7 comorbid conditions. Providers and patients viewed implementation of the intervention as feasible and acceptable. Providers reported that the intervention improved communication and coordination among in- and outpatient teams, use of stroke best practices, and understanding of patients' needs, and built capacity in stroke rehabilitation and collaborative care. The results summary score at 6-months compared with baseline (Mean difference: -2.32, 95% CI: -6.83, 2.20). There were statistically-significant increases in the cost of use of outpatient services, physician specialists, and family physician visits. These increased costs were offset by a statisticallysignificant decrease in the cost of use of hospitalization and emergency room visits at 6-months compared with baseline. Discussion: This study provides initial evidence for the feasibility and preliminary effects of the intervention in reducing the use of hospitalization and emergency department visits and improving provider and patient experience. Conclusions: The results will inform knowledge users regarding the feasibility and preliminary effectiveness of a new and integrated intervention to optimize transitional care outcomes for older adults with stroke and multimorbidity. Suggestions for future research: Future research is needed to further test this intervention using a pragmatic randomized controlled trial, larger sample size, and a full economic evaluation.
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93. **Improving time spent 'active' on a stroke rehabilitation unit**
Thomson J., Anderson B., Hill L., Brown C., Forrester K. 2019
Introduction: Activity outside of individual therapy sessions on stroke rehabilitation units (SRUs) is increasingly recognised as important-stroke survivors report 'dead and wasted' time. Method(s): LTHT SRU has developed an activity enrichment programme over the last 2 years. It includes: Patient questionnaires and staff 'Ideas board.' Purchasing/replenishing suitable activity resources that are freely available. Publicising the importance of being active to patients, families/friends and staff. (e.g. in SRU stroke handbook, at family meetings, ward board) Timetabled weekly groups e.g. "Conversation Club", "Breakfast Club", "Exercise group", "Art Group" (involving volunteer owner of local art/craft business). Increasing therapy "homework" (e.g. physiotherapy and occupational therapy (OT) providing exercises, speech &language therapy (SLT) lending IPads for language therapy). Weekend activity programme to highlight patients for nursing staff to support. Research activity: SLT-led qualitative study exploring how patients with aphasia wish to spend their time outside of therapy and participation in RECREATE study to reduce sedentary behaviour. Activity Champions e.g. to maintain resources, enable group participation, identify 'gaps' in patients daily therapy timetable and provide the opportunity to be active. Result(s): Patients and staff have given positive feedback (e.g. from groups), promotion of activity by staff has improved and less time is spent inactive by patients. Conclusion(s): The programme has benefited patients on the SRU. Activity champions, promoting the importance of activity, targeting activity at both small and larger scale, and systematic organisation have helped the intervention programme embed.
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94. **Introduction to the Special Issue: Communication Intervention for Individuals with Complex Communication Needs**
Sigafoos Jeff, Gevarter Cindy. 2019
Individuals with complex communication needs are likely to experience considerable difficulties and challenges with everyday communication interactions due to limited use and understanding of natural speech. In this editorial, we review the nature of complex communication needs, describe the wide range of individuals who may experience such needs, and provide a brief history of behavioral approaches to addressing these needs. We also highlight the six papers in this special issue that contribute to the further understanding of the use of behavioral intervention approaches for addressing complex communication needs. These papers include one conceptual overview of aided augmentative and alternative communication (AAC) interventions for individuals with complex communication needs, four intervention studies addressing a range of communicative topographies (i.e., vocal speech, AAC, and a

social messaging app), and one systematic review examining interventions that promote communicative response variability. These six papers highlight the diversity of complex communication needs and emphasize the importance of examining the efficacy of a wide range of individualized behavioral approaches that are matched to specific needs and goals.
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95. **Key-to-Voice app: A simple speech-generating device suitable (not only) for a hospital environment**

Mertl Jiří, Frič Vojtěch. 2019

BACKGROUND: In this article, we will present Key-to-Voice, a software design that we developed in collaboration with people who have complex communication needs and respective research that we conducted during the collaboration. The design is the first of its kind and there has not been any similar research linked to testing the design in the Czech Republic. OBJECTIVE: Our original intention was to develop a device that could give a voice to people with severe health problems and enable them to verbalise their thoughts after medical treatment in hospital. METHODS: Participatory design was used throughout the development and we employed participatory observation, informal interviews and simple questionnaire for the research of the possibilities of the design implementation in a hospital environment. RESULTS: Target group accepted the design we developed without any major problems and, at the same time, the design, and its possibilities of implementation and usage, was improved by participation of people who will be potentially using it. Given that our target group consists mainly of older adults with some kind of complex communication need, possibly acquired disability, we had to consider these aspects during development, as there is, for example, a problem in that older adults can have difficulty using technologies. CONCLUSION: Our design is usable in a hospital environment without any major problems. Participatory design is a very effective approach for making any design better and more usable by a target group, and for minimising bias, stigmatization and exclusion.
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96. **Medical Mobile Applications for Stroke Survivors and Caregivers**

Piran Pirouz, Thomas Jinu, Kunnakkat Saroj, Pandey Abhishek, Gilles Nadege, Weingast Sarah, Burton Dee, Balucani Clotilde, Levine Steven R. 2019

BACKGROUND: Recent studies estimate nearly half of the US population can access mobile medical applications (apps) on their smartphones. The are no systematic data available on apps focused on stroke survivors/caregivers., OBJECTIVE: To identify apps (a) designed for stroke survivors/caregivers, (b) dealing with a modifiable stroke risk factor (SRF), or (c) were developed for other purposes but could potentially be used by stroke survivors/caregivers., METHODS: A systematic review of the medical apps in the US Apple iTunes store was conducted between August 2013 and January 2016 using 18 predefined inclusion/exclusion criteria. SRFs considered were: diabetes, hypertension, smoking, obesity, atrial fibrillation, and dyslipidemia., RESULTS: Out of 30,132 medical apps available, 843 (2.7%) eligible apps were identified. Of these apps, (n=74, 8.7%) apps were specifically designed for stroke survivors/caregivers use and provided the following services: language/speech therapy (n=28, 37%), communication with aphasic patients (n=19, 25%), stroke risk calculation (n=11, 14%), assistance in spotting an acute stroke (n=8, 10%), detection of atrial fibrillation (n=3, 4%), direction to nearby emergency room (n=3, 4%), physical rehabilitation (n=3, 4%), direction to the nearest certified stroke center (n=1, < 2%), and visual attention therapy (n=1, <2%). 769 apps identified that were developed for purposes other than stroke. Of these, the majority (n=526, 68%) addressed SRFs., CONCLUSIONS: Over 70 medical apps exist to specifically support stroke survivors/caregivers and primarily targeted language and communication difficulties. Apps encompassing most stroke survivor/caregiver needs could be developed and tested to ensure the issues faced by these populations are being adequately addressed.
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97. **RecoverNow: A mobile tablet-based therapy platform for early stroke rehabilitation**

Pugliese Michael, Ramsay Tim, Shamloul Rany, Mallet Karen, Zakutney Lise, Corbett Dale, Dukelow Sean, Stotts Grant, Shamy Michel, Wilson Kumanan, Guerinet Julien, Dowlatshahi Dar. 2019

Introduction: Stroke survivors frequently experience a range of post-stroke deficits. Specialized stroke rehabilitation improves recovery, especially if it is started early post-stroke. However, resource limitations often preclude early rehabilitation. Mobile technologies may provide a platform for stroke survivors to begin recovery when they might not be able to otherwise. The study objective was to demonstrate the feasibility of RecoverNow, a tablet-based stroke recovery platform aimed at delivering speech and cognitive therapy. Methods: We recruited a convenience sample of 30 acute stroke patients to use RecoverNow for up to 3 months. Allied health professionals assigned specific applications based on standard of care assessments. Participants were encouraged to take home the RecoverNow tablets upon discharge from acute care. The study team contacted participants to return for a follow- up interview 3 months after enrollment. The primary outcome of interest was feasibility, defined using 5 facets: recruitment rate, adherence rate, retention rate, the proportion of successful follow-up interventions, and protocol deviations. We tracked barriers to tabletbased care as a secondary outcome. Results: We successfully recruited 30 of 62 eligible patients in 15 weeks (48% recruitment rate). Participants were non-adherent to tablet-based therapy inside and outside of acute care, using RecoverNow for a median of 12 minutes a day. Retention was high with 23 of 30 patients participating in follow-up interviews (77% retention rate) and all but 3 of the 23 interviews (87%) were successfully completed. Only 2 major protocol deviations occurred: one enrollment failure and one therapy protocol violation. Barriers to tablet-based care were frequently encountered by study participants with many expressing the assigned applications were either too easy or too difficult. Conclusions: Acute stroke patients are interested in attempting tablet-based stroke rehabilitation and are easily recruited early post-stroke. However, tablet-based therapy may be challenging due to patient, device and system-related barriers. Reducing the frequency of common barriers will be essential to keeping patients engaged in tablet-based therapy. (Source: journal abstract)
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98. **RecoverNow: A multicenter Phase II randomized controlled trial of early mobile tablet-based speech therapy for acute stroke patients with aphasia**

Dowlatshahi D., Mallet K. H., Ramsay T., Thavorn K., Leonard C., Stotts G., Shamy M., Blacquiere D., Eng J. J., Dukelow S., Pikula A., Richardson D., Laird L., McQueen L., Rochon E. 2019

Introduction: Best Practice Recommendations state, "Persons with aphasia should have early access to a combination of intensive language and communication therapy," yet access to therapy is often delayed due to limited healthcare resources: in 2014, only 16% of Canadians with stroke accessed inpatient rehabilitation. Of those, only 50% accessed rehabilitation centers within two weeks of their stroke. Moreover, during acute care, patients spend the majority of their time in bed. We developed RecoverNow to use mobile tablet technologies to "bring rehab to the patient," to leverage the downtime experienced in acute care, and to provide language therapy as patients transition through levels of care. Method(s): We propose a multicenter Phase II randomized controlled trial of early mobile tablet-based speech therapy for acute stroke patients with aphasia. Patients will be recruited from the Ottawa Hospital, the Calgary Foothills Hospital, and the Toronto Western Hospital, after a standard-of-care SLP assessment for aphasia. Using a futility design, we will randomize inpatients to mobile tablet-based speech therapy applications vs. standard of care. Primary outcome is improvement in the WAB-AQ at 90 days, with a secondary cost-effectiveness analysis. We will recruit 226 patients for 80% power to disprove the null hypothesis at an a of 0.1 (accounting for 10% attrition). Result(s): Our trial received central REB approval, is registered (NCT03755063), and has received funding from the Heart & Stroke Foundation of Canada. Recruitment will start in summer 2019. Conclusion(s): We expect to find that starting RecoverNow therapy in the acute care setting is not futile, and we will move to a Phase III trial.

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99. **RecoverNow: A patient perspective on the delivery of mobile tablet-based stroke rehabilitation in the acute care setting**

Mallet Karen, Shamloul Rany, Pugliese Michael, Power Emma, Corbett Dale, Hatcher Simon, Shamy Michel, Stotts Grant, Zakutney Lise, Dukelow Sean, Dowlatshahi Dar. 2019

BACKGROUND/AIMWe previously reported the feasibility of RecoverNow (a mobile tablet-based post-stroke communication therapy in acute care). RecoverNow has since expanded to include fine motor and cognitive therapies. Our objectives were to gain a better understanding of patient experiences and recovery goals using mobile tablets.METHODSSpeech-language pathologists or occupational therapists identified patients with stroke and communication, fine motor, or cognitive/perceptual deficits. Patients were provided with iPads individually programmed with applications based on assessment results, and instructed to use it at least 1 h/day. At discharge, patients completed a 19-question quantitative and open-ended engagement survey addressing intervention timing, mobile device/apps, recovery goals, and therapy duration.RESULTSOver a six-month period, we enrolled 33 participants (three did not complete the survey). Median time from stroke to initiation of tablet-based therapy was six days. Patients engaged in therapy on average 59.6 min/day and preferred communication and hand function therapies. Most patients (63.3%) agreed that therapy was commenced at a reasonable time, although half expressed an interest in starting sooner, 66.7% reported that using the device 1 h/day was enough, 64.3% would use it after discharge, and 60.7% would use it for eight weeks. Sixty-seven percent of patients expressed a need for family/friend/caregiver to help them use it.CONCLUSIONOur results suggest that stroke patients are interested in mobile tablet-based therapy in acute care. Patients in the acute setting prefer to focus on communication and hand therapies, are willing to begin within days of their stroke and may require assistance with the tablets.

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100. **Smart medicationtm-a pilot study for investigating the feasibility of speech recognition of natural language to access electronic patient diary**

Roesch A., Schmoldt D., Mondorf W., Fischer R. 2019

Background: smart medicationTM was successfully implemented in haemophilia home treatment. Until now patients enter treatment data using either a smartphone-app or a web-browser. The aim of this study was to analyse and evaluate the use of speech recognition as an additional interface to the electronic diary. Method(s): An additional interface to the smart medicationTM platform was implemented to allow patients to use natural language to enter treatment data into the electronic diary. The technology used is based on the well-established Alexa speech recognition framework provided by Amazon Inc. Result(s): It is shown that a set of about ten speech commands is sufficient to provide easy diary access for patients to handle their daily treatment documentation. This includes documentation of recurrent prophylactic treatments as well as more complex commands like change of product, dosage or batch information. The speech commands implemented can be easily used by patients and allow even faster documentation compared to smartphone-app or web-browser data entry. Patient feedback also indicate a much better compliance to documentation due to ease of use of natural language. However, patients need to be precisely informed how their personal data is handled. In particular complete and thorough transparency in accordance to GDPR (DSGVO) is mandatory. Conclusion(s): Natural speech allows even faster treatment documentation into smart medicationTM electronic diary compared to the usage of smartphone-app or web-browser. The objective of optimal patient compliance including instant and complete treatment documentation can be further improved by using natural language and a speech interface into electronic diaries.

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101. **Speech therapy 4.0 - Therapeutic homework with the tablet: Assistive digital systems are on the rise - The example of SpeechCare**
Bohm S. 2019
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102. **Tele rehabilitation services in Saudi Arabia: Rehabilitation clinicians perspective**
Ullah S., Maghazil A., Qureshi A. Z., Tantawy S., Moukais I., Aldajani A. 2019
Objective: Aim of the study was to explore the knowledge and attitudes of Saudi Rehabilitation clinicians about Tele rehabilitation (TR) Design: An electronic survey questionnaire was distributed among rehabilitation clinicians across different regions in Saudi Arabia. Setting(s): Rehabilitation Hospital King Fahad Medical City Riyadh Saudi Arabia Participants: 82 Rehabilitation clinicians participated across different regions in Saudi Arabia Interventions: NA Main Outcome Measure(s): knowledge and attitudes of Saudi Rehabilitation clinicians about Tele rehabilitation (TR). Rehabilitation clinicians Concerns about Tele rehabilitation (TR) Results: 82 clinicians participated in this study out of which 63% (52) were males, and 36 % (30) were female. 65 (79.2%) were working in inpatient rehabilitation facility and 79 (96.34%) were using smartphones. The respondents included Physiatrists 30.49% (25), Physical Therapist 26.83% (22), Speech-Language 20.73% (17), Rehabilitation Nurses 7.32% (6), Orthotist 7.32% (6), Psychologist 4.88% (4) and Occupational Therapist 2.44% (2). 46.34% (38) were aware of TR technology but had not used it, 19.51% (16) were aware of technology and used it on an intermittent basis, 18.29% (15) had good knowledge and used it on regular basis whereas 15.85 (13) did not know about the technology. 69.51% (57) considered both TR and Community Based Rehabilitation as methods to improve the rehabilitation services delivery system in the country. 43.90% (36) lacked information about communication technology. High cost, patient compliance, policy making, and lack of skilled personnel were identified as limitation factors for using TR services. 52.44% (43) considered data security, patient privacy, and consultation from unauthorized person as associated risk of TR services. Conclusion(s): We emphasize to adopt measure to increase utilization of Tele rehabilitation(TR) . The clinician concerns can be addressed by enhancing awareness about TR and establishing local TR guidelines. Our study also emphasizes gradual implication of TR, careful selection of appropriate patients, staff training and policy maker to start initiative locally.
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103. **Telling tales: unlocking the potential of AAC technologies**
Waller Annalu. 2019
Augmentative and alternative communication (AAC) has been transformed by the social media revolution made possible by the emergence of mobile technology. The cumbersome dedicated devices of the 1970s have evolved into a burgeoning AAC app industry. However, the limited use and abandonment of AAC technologies remains high. Unlocking the untapped potential of technology requires a paradigm shift in the design of AAC technologies by building systems that minimize the cognitive load placed on users, adapting to their individual physical and language needs. Telling Tales shares insights and stories of how the combination of user-centred design, interdisciplinary research and the application of intelligent computing is providing a vision of future generations of AAC technologies.
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104. **The effect of a tablet-based aphasia therapy in the chronic phase after stroke**
De Cock E., Batens K., Cocquyt E. M., Stalpaert J., De Groote E., Feiken J., De Letter M., Oostra K., De Herdt V. 2019
Background and Aims: Aphasia after stroke can majorly impact a persons' quality of life. Intensive aphasia therapy can improve language functions, even in the chronic stage of recovery. However, the desired intensities for language rehabilitation are often challenging to achieve due to limited health care resources, transportation difficulties, fatigue etc. New technological developments such as computer- and tablet-based aphasia therapies as an add-on to conventional face-to-face therapy might be a promising rehabilitation tool to enhance therapy effects. This study will investigate the clinical, functional and neurophysiological effects of intensive tablet-based aphasia therapy as an add-on to conventional face-to-face therapy compared to conventional therapy alone in patients with aphasia following stroke. Method(s): A randomized, parallel-group, sham-controlled, single-blinded clinical trial will be performed. Thirty-six right-handed persons with aphasia following a first left hemispheric stroke in the chronic stage of recovery (>6 months post-stroke) will be randomly allocated into one of three groups. After repeated baseline measurements, all groups will receive face-to-face therapy for 3 weeks (3hours/week). In the active condition, patients will practice an additional 5 hours/week with a language app 'STAPP', whereas a first sham group will use a tablet in a recreational way and a second sham group will be restricted from tablet use. Therapy-effectiveness will be measured by specific linguistic tests, functional communication abilities, quality of life and event-related potentialsat baseline, immediately before and after intervention, and at 3 months follow-up. Result(s): Data collection is ongoing. Conclusion(s): We hope to confirm that additional tablet-based aphasia therapy can improve functional outcome.
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105. **Therapist-Guided Tablet-Based Telerehabilitation for Patients With Aphasia: Proof-of-Concept and Usability Study**
Gerber Stephan Moreno, Schütz Narayan, Uslu Arif Sinan, Schmidt Nadine, Röthlisberger Carina, Wyss Patric, Perny Sandra, Wyss Corina, Koenig-Bruhin Monica, Urwyler Prabitha, Nyffeler Thomas, Marchal-Crespo Laura, Mosimann Urs Peter, Müri René Martin, Nef Tobias. 2019
BACKGROUNDAphasia is the loss or impairment of language functions and affects everyday social life. The disorder leads to the inability to understand and be understood in both written and verbal communication and affects the linguistic modalities of auditory comprehension, verbal expression, reading, and writing. Due to heterogeneity of the impairment, therapy must be adapted individually and dynamically to patient needs. An important factor for successful aphasia therapy is dose and intensity of therapy. Tablet computer-based apps are a promising treatment method that allows patients to train independently at home, is well accepted, and is known to be beneficial for patients. In addition, it has been shown to ease the burden of therapists.OBJECTIVEThe aim of this project was to develop an adaptive multimodal system that enables aphasic patients to train at home using language-related tasks autonomously, allows therapists to remotely assign individualized tasks in an easy and time-efficient manner, and tracks the patient's

progress as well as creation of new individual exercises.METHODSThe system consists of two main parts: (1) the patient's interface, which allows the patient to exercise, and (2) the therapist's interface, which allows the therapist to assign new exercises to the patient and supervise the patient's progress. The pool of exercises is based on a hierarchical language structure. Using questionnaires, therapists and patients evaluated the system in terms of usability (ie, System Usability Scale) and motivation (ie, adapted Intrinsic Motivation Inventory).RESULTSA total of 11 speech and language therapists (age: mean 28, SD 7 years) and 15 patients (age: mean 53, SD 10 years) diagnosed with aphasia participated in this study. Patients rated the Bern Aphasia App in terms of usability (scale 0-100) as excellent (score >70; Z=-1.90; P=.03) and therapists rated the app as good (score >85; Z=-1.75; P=.04). Furthermore, patients enjoyed (scale 0-6) solving the exercises (score>3; mean 3.5, SD 0.40; Z=-1.66; P=.049).CONCLUSIONSBased on the questionnaire scores, the system is well accepted and simple to use for patients and therapists. Furthermore, the new tablet computer-based app and the hierarchical language exercise structure allow patients with different types of aphasia to train with different doses and intensities independently at home. Thus, the novel system has potential for treatment of patients with aphasia as a supplement to face-to-face therapy.
https://libkey.io/libraries/2762/openurl?genre=article&au=Gerber%2C+Stephan+Moreno%3BSch%C3%BCtz%2C+Narayan%3BUslu%2C+Arif+Sinan%3BSchmidt%2C+Nadine%3BR%C3%B6thlisberger%2C+Carina%3BWyss%2C+Patric%3BPerny%2C+Sandra%3BWyss%2C+Corina%3BKoenig-Bruhin%2C+Monica%3BUrwyler%2C+Prabitha%3BNyffeler%2C+Thomas%3BMarchal-Crespo%2C+Laura%3BMosimann%2C+Urs+Peter%3BM%C3%BCri%2C+Ren%C3%A9+Martin%3BNef%2C+Tobias&aulast=Gerber&issn=23692529&isbn=&title=Therapist-Guided+Tablet-Based+Telerehabilitation+for+Patients+With+Aphasia%3A+Proof-of-Concept+and+Usability+Study.&jtitle=JMIR+rehabilitation+and+assistive+technologies&pubname=JMIR+rehabilitation+and+assistive+technologies&btitle=&atitle=Therapist-Guided+Tablet-Based+Telerehabilitation+for+Patients+With+Aphasia%3A+Proof-of-Concept+and+Usability+Study.&volume=6&issue=1&spage=e13163&date=2019&doi=10.2196%2F13163&sid=ProQuest this link

106. **Toward Improving Poststroke Aphasia: A Pilot Study on the Growing Use of Telerehabilitation for the Continuity of Care**

Maresca G., Maggio M. G., Latella D., Cannavo A., De Cola M. C., Portaro S., Stagnitti M. C., Silvestri G., Torrisi M., Bramanti A., De Luca R., Calabro R. S. 2019

Background: Aphasia is a quite common and very disabling symptom following stroke, negatively affecting patient's quality of life. Aim of the study is to evaluate the effectiveness of a rehabilitation training for aphasia that employ a touch-screen tablet using a virtual reality rehabilitation system (VRRS-Tablet). Material(s) and Method(s): Thirty patients with aphasia due to ischemic or hemorrhagic stroke were randomized into either the control or the experimental group and assessed by means of a specific neuropsychological evaluation. The study lasted 6 months and included 2 phases. During the former, the experimental group underwent an experimental linguistic treatment performed using the VRRS-Tablet, while the control group was trained with a traditional linguistic treatment. In the latter, the control groups were delivered to territorial services, while the experimental group was provided with the VRRS-Tablet. Result(s): The experimental group improves in all the investigated areas, except for writing, while the control group only improves in comprehension, depression, and quality of life. Conclusion(s): Our study has demonstrated the effectiveness of a home-based telerehabilitation program specific for poststroke aphasia. The use of telerehabilitation by means of VRRS-Tablet could be one of the best solutions to treat aphasic patients after their discharge, promoting continuity of care by monitoring functional outcomes, maintaining preserved abilities, reducing depression, and improving linguistic functions, besides the psychological well-being.Copyright © 2019 Elsevier Inc.
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107. **Understanding enablers and barriers to using technology with people with traumatic brain injury**

Munsell M., Dubas E., Saxena S., Godlove J., Kiran S. 2019

Research has shown that people with neurological disorders experience continued improvement in speech, language, and cognitive skills with ongoing rehabilitation. Despite this, barriers such as insurance coverage and proximity to clinics can hinder a patient's ability to access the therapy required for optimal functional recovery. To offset this lack of sufficient therapy, the use of home-based technology in rehabilitation has become a growing area of research. The use of technology presents its own challenges, however, with engagement tending to be lower among the elderly and those that live in rural areas. This study retrospectively analyzed the data for patients with traumatic brain injury (TBI) that used Constant Therapy (CT), a cloud-based rehabilitation program that delivers standard speech and language therapy exercises via tablet, to determine if usage patterns differed by patient demographic characteristics. User demographics included age, gender, time post-onset, and urban vs. rural geographic location. Activity metrics examined were 1) the total number of completed therapy sessions and 2) the average number of active days per week, both during the first 20 weeks of CT use. The effect of demographic covariates on therapeutic activity was assessed using ANOVA and linear regression. 646 patients with TBI and a language and/or cognitive deficit were included in the analysis, with a mean age of 48.9 years (+/-18.1), 41.5% female, 8% living in a rural location, and 42.3% having acute condition (=6 months post-onset). The average patient completed 35.4 therapeutic sessions and engaged with the platform 3.1 days per week. ANOVA results suggest a statistically significant effect of gender ($F(1,644)=6.33$, $p<0.05$) and acute condition ($F(1,644)=5.28$, $p<0.05$) on the total number of sessions completed, and no statistically significant effect of any demographic characteristic on the average number of active days per week. After controlling for all model covariates, patients with chronic TBI completed 7.96 more sessions than patients with acute condition ($p<0.05$) and male patients completed 8.44 more sessions than female ($p<0.01$). Results from the linear regression confirmed no statistically significant impact of age, gender, geographic location or acute status on the average number of days per week a patient engaged with the digital platform. Although the average TBI patient in our sample was young and lived in an urban setting, patients that were older or from a rural location did not differ in their use of digital therapy after accounting for gender and time post-TBI onset. Our results suggest that typical barriers to technological adoption may not impact a patient with TBI's ability to engage with home-based rehabilitation technology. However, clinical characteristics such as time postonset suggest that chronic TBI survivors likely need and are able to access digital rehabilitation.
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108. **Usability of a daily mHealth application designed to address mobility, speech and dexterity in Parkinson's disease**

Horin Adam P., McNeely Marie E., Harrison Elinor C., Myers Peter S., Sutter Ellen N., Rawson Kerri S., Earhart Gammon M. 2019

Aim: This study investigated the usability of a mobile health (mHealth) smartphone application to treat gait, speech and dexterity in people with Parkinson's disease. Methods: Participants either used an mHealth application (intervention) or maintained their normal

routine (control) for 12 weeks and were evaluated at baseline and post-test time points for primary outcome measures of adherence, gait, speech and dexterity. mHealth application adherence was compared with percent change scores on gait, speech and dexterity measures. Results: Adherence was moderate and there were no significant group, time or interaction effects for any outcome measures. Correlations between adherence and outcomes were weak and negative. Conclusion: These data suggest that usability of this mHealth application was limited as indicated by low adherence. The application alone in its present form was not adequate to treat symptoms of gait, speech or dexterity in people with Parkinson's disease.
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109. **Using smartphones to deliver intensive voice therapy for individuals with Parkinson's disease**
Yen C., Ahmad K., Ying C. S., Ibrahim N. 2019
Objective: This study examined the voice performance outcome and patients' perceptions after intensive voice therapy for individuals with Parkinson's disease (PD) via smartphone. Background(s): Among the hypokinetic dysarthria symptoms, hypophonia is the most typical and the main reason for reduced speech intelligibility (1). Intensive voice therapy targeting vocal loudness has been shown to be effective to improve vocal loudness and speech intelligibility in individuals with PD (2). However, the accessibility to intensive voice therapy remain limited, due to patients' restricted mobility, travel issues and unavailability of speech-language therapists in Malaysia. Smartphones with cellular internet being one of the commonly used telecommunication devices in the 21st century offers the potential to overcome the barriers to deliver the services to these underserved population. Method(s): Eleven participants (mean age 65 years, SD 6.9; mean post-onset duration 8.5 years; mild-moderate hypokinetic dysarthria) were recruited to the study. All participants received intensive voice therapy via a free videoconferencing platform in their smartphones (WhatsApp or WeChat). They completed twelve sessions of therapy over four weeks. Their voice performance and perception were measured in person before and after therapy. The outcome measurement tools included a perceptual judgement of voice performance via Consensus Auditory-Perceptual Evaluation of Voice-V (CAPE-V) rated by two speech-language therapists, measurements of loudness (dB SPL), Voice Handicap Index-10 (VHI-10) and the Smartphone Based Therapy Satisfaction Questionnaire (STSQ)-a patient satisfaction questionnaire. Result(s): Comparison between pre-and post-treatment results for measurement of vocal loudness indicated a statistically significant ($p<0.05$) increase for sustained vowel (pre=67.85 dB SPL, post =73.86 dB SPL) and monologue (pre=58.65 dB SPL, post=64.61 dB SPL) whereas no significant change in reading task. The participants' fundamental frequency (F0) showed no changes after treatment. A series of Wilcoxon signed ranked tests were conducted to examine participants' speech intelligibility and each voice parameter in CAPE-V. The results revealed significant improvement in speech intelligibility, overall severity and loudness level, with no change in roughness, breathiness, strain, and pitch. A positive response was observed in the participants' perception about their vocal functions post treatment via VHI-10 (pre =19.73 points, post = 12.91 points, $p<0.05$). Before the treatment using smartphone, some of the participants were uncertain of the comprehensiveness of instructions, adequacy of time to respond, comfort levels, and preference for face-to-face consultation. However, these aspects were significantly improved with more than 70% participants agreeing on all statements in STSQ which reflected a positive experience on smartphone service delivery. Conclusion(s): This study demonstrated that intensive voice therapy using smartphones is an effective and feasible method to improve speech and voice performance in individuals with PD. Positive responses from participants about their experience with smartphone delivery method indicated that this novel telepractice method was acceptable. Future studies should examine the effectiveness of intensive voice treatment via smartphones for individuals with PD compared to face-to-face in individuals with PD.
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110. **A baseline audit of alternative and augmentative communication aid provision for people with MND in NHS Scotland**
Elliott E., Newton J., Colville S., Davenport R., Gorrie G., Morrison I., Chandran S., Pal S. 2018
Background: The importance of providing communication aids to people with MND (pwMND) who have difficulty speaking has been crystallised by Scottish legislation, which came into effect from March 2018 (1). This mandates that provision of communication equipment and support to use this must be secured for any person who has difficulty speaking (1). Objective(s): To conduct a baseline pre-legislation national audit of alternative and augmentative communication (AAC) aid provision for pwMND in NHS Scotland using the Clinical Audit Research and Evaluation of MND (CARE-MND) platform, the National MND Register for Scotland. Method(s): Anonymised data fields relevant to AAC provision were extracted from the CARE-MND platform for all patients alive and resident in Scotland on 16.03.2018. Additional information regarding AAC provision was provided by the charitable body MND Scotland (MNDS). The overall provision of AAC was established by manual category coding of the qualitative data. Result(s): A total of 354 pwMND; 111 (31.4%) were using a variety of different AAC aids and the NHS had contributed to AAC provision in 71 (64%) of cases. 243/354 pwMND (69%) had been referred to Speech and Language Therapy teams. A variety of high and low technology AAC were in use, the most common was a tablet device (53, 47.7%), followed by eyegaze personal computer (15, 13.5%) and Lightwriter (11, 9.9%). 20 (5.6%) pwMND declined AAC support. 11 (3.1%) of pwMND were provided with environmental control systems for limb dysfunction without evidence of significant speech impairment and MNDS was the main provider (55%). 161 (45.5%) pwMND were classified as not requiring AAC, 31 (8.8%) pwMND were classified as possibly requiring AAC and further information is required to explore this. Discussion and conclusions: The majority of pwMND in Scotland requiring support for impaired speech have access to AAC provided either by their local NHS services, or MNDS. Guidance is required to standardise the assessment and management of impaired speech and to develop care pathways (2). Speech is one element of communication and patients with limited mobility also require support from health boards for environmental aids. Further qualitative research can help understand the impact of AAC on pwMND and their caregivers.
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111. **A new generation in aphasia therapy-tablet-based rehabilitation of speech and language**
Nef T., Wyss P., Gerber S., Perny S., Wyss C., Urwyler P., Uslu S., Schmidt N., Chesham A., Gutbrod K., Muri R. M. 2018
Objectives: A recent Cochrane intervention review revealed evidence for the effectiveness of using speech and language therapy (SLT) for people with aphasia following stroke. Findings particularly highlight positive effects of higher training frequency. An aphasia tele-rehabilitation application (Bern Aphasia App) was developed to increase training frequency and duration for patients. With the Bern Aphasia App, patients can train independently under the surveillance of the therapists. Method(s): The Bern Aphasia App consists of a patient, a therapist and an admin interface. The patient interface contains 10 different exercise types (>11'000 exercises). New exercises can be created by therapists using a web-based admin interface. The therapist interface allows therapists

to assign tailored exercises to individual patients needs and monitor the statistics. The usability and acceptance were tested in 25 healthy participants and 10 aphasia patients with the System Usability Scale (SUS). Result(s): More than 134 aphasia patients trained for 197.2 hours. Preliminary studies revealed average SUS scores of 94.5 for healthy participants and 93.2 for patients (maximum 100). Conclusion(s): The Bern Aphasia App is accepted and currently used in a clinical context. By using tele-communication technologies, therapists can adjust the task categories and the difficulty level, which should ensure patients' motivation and participation even with high frequency trainings. Hence, the application serves a possibility to increase patients' language skills and quality of life. The benefits of high frequency tele-rehabilitation in aphasia outpatients is being evaluated in an ongoing clinical trial. In Switzerland aphasia outpatients receive less therapy than recommended in guidelines, hence positive results in the clinical trial would have a great socioeconomic impact.
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112. **A new initiative towards selection and delivery of low cost assistive technology (AT) for neuro-rehab patients in India**
Prasad R., Lala T. 2018
Objectives: 75 % of TBI in India occur to people of low socio economic groupwho live in rural areas. 1.5 million patients every year, with other neurological problems, need neuro-rehabilitation. Apart from lack of awareness regrading neuro-rehabilitation, there is virtually no access to neuro-rehabilitation for most patients in India. On way to overcome this problem is to develop apps for neuro-rehabilitation for use by the 220 million smartphone users and to have centers where low cost AT solutions will be providedto these patients and follow-up will be done through Tele -rehab. This pilot project can then be expanded to the national level with Govt. support. Method(s): * Patients who visitour Neuro rehab center will beidentified on the basis of theirimpairments in locomotion, hearing, vision, cognitive speech and memory impairments (ADL). The need of low cost AT solution for the individual patient will be met through our panel of Physiotherapist, Occupational Therapist, Speech and Language therapist, Psychologist, Neuro physician and Neuro surgeon. * Low cost AT solutions will be developed in association with AT engineers of IIT. * Neuro-rehabilitation in general and the use of AT provided to these patients will be monitored through Tele-rehab Results: * Research protocols on efficacy of AT in community based neurorehab through Tele-rehabwill be developed. * Training of rehab specialist in AT solutions. Conclusion(s): A large number of patients in India do not receive neurorehab because they live in rural community because they are poor. This pilot project will help identify if the needs can be met through low cost AT solutions and tele-rehab.
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113. **Applying Natural Language Processing to Understand Motivational Profiles for Maintaining Physical Activity After a Mobile App and Accelerometer-Based Intervention: The mPED Randomized Controlled Trial**
Yoshimi Fukuoka Teri G. Lindgren Yonatan Dov Mintz Julie Hooper Anil Aswani. 2018
Applying Natural Language Processing to Understand Motivational Profiles for Maintaining Physical Activity After a Mobile App and Accelerometer-Based Intervention: The mPED Randomized Controlled Trial Regular physical activity is associated with reduced risk of chronic illnesses. Despite various types of successful physical activity interventions, maintenance of activity over the long term is extremely challenging. The aims of this original paper are to 1) describe physical activity engagement post intervention, 2) identify motivational profiles using natural language processing (NLP) and clustering techniques in a sample of women who completed the physical activity intervention, and 3) compare sociodemographic and clinical data among these identified cluster groups. In this cross-sectional analysis of 203 women completing a 12-month study exit (telephone) interview in the mobile phone-based physical activity education study were examined. The mobile phone-based physical activity education study was a randomized, controlled trial to test the efficacy of the app and accelerometer intervention and its sustainability over a 9-month period. All subjects returned the accelerometer and stopped accessing the app at the last 9-month research office visit. Physical engagement and motivational profiles were assessed by both closed and open-ended questions, such as "Since your 9-month study visit, has your physical activity been more, less, or about the same (compared to the first 9 months of the study)?" and, "What motivates you the most to be physically active?" NLP and cluster analysis were used to classify motivational profiles. Descriptive statistics were used to compare participants' baseline characteristics among identified groups. Approximately half of the 2 intervention groups (Regular and Plus) reported that they were still wearing an accelerometer and engaging in brisk walking as they were directed during the intervention phases. These numbers in the 2 intervention groups were much higher than the control group (overall P=.01 and P=.003, respectively). Three clusters were identified through NLP and named as the Weight Loss group (n=19), the Illness Prevention group (n=138), and the Health Promotion group (n=46). The Weight Loss group was significantly younger than the Illness Prevention and Health Promotion groups (overall P.05). The findings could be relevant to tailoring a physical activity maintenance intervention. Furthermore, the findings from NLP and cluster analysis are useful methods to analyze short free text to differentiate motivational profiles. As more sophisticated NL tools are developed in the future, the potential of NLP application in behavioral research will broaden. ClinicalTrials.gov NCT01280812; https://clinicaltrials.gov/ct2/show/NCT01280812 (Archived by WebCite at http://www.webcitation.org/70lkGagAJ).
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114. **Assessment and speech-language intervention program in non-fluent primary progressive aphasia: A case study**
Valles-Gonzalez B., Rosell-Clari V. 2018
Background: Primary Progressive Aphasia (PPA) is a syndrome where language disorders manifest as an initial symptom when expressing and comprehending language and therefore lead to a dramatic loss of the ability to communicate effectively. Non-Fluent Primary Progressive Aphasia (NF-APP) is a type of PPA characterized by the presence of agrammatism, marked effort in the production of speech associated with apraxia, non-fluent expressive language, phonemic paraphasias, and dysprosody. Objective(s): This research sought to know the linguistic-cognitive profile of a patient with PPA-NF and evaluate the effectiveness of a language intervention program aimed at improving the affected linguistic-cognitive skills. Method(s): A case study was designed. A male adult of 60 years right handed whit diagnoses of NF-PPA was selected. The initial symptoms date from 2012 and anticipated the future presence of verbal apraxia. As of this date, his oral expression has worsened. The initial symptoms were: phonemic paraphrases, faults in the access to the lexicon, reduction of the grammatical structure of the sentences, mental blocks, and rhythm failures. The main alterations were: substitutions of words and syllables, and articulatory disorders. The results of the patient's brain MRI (05/30/2013) showed a minimal left frontal atrophy. At the end of July 2016 the patient was evaluated through two types of tests adapted to the Spanish population, which allowed to identify cognitive-linguistic symptoms in this type of disorder and which were

useful in the task of designing the speech and language intervention program. One of them was the Addenbrooke's Cognitive Examination-III or ACEIII Spanish version (Matias-Guiu et al., 2015), this cognitive test assessments five cognitive domains: attention, memory, verbal fluency, language and visuospatial function; the other was the MetAphAs Test (Rosell-Clari & Hernandez Sacristan, 2014),which is a protocol for to assessment metalinguistic skills in patients with aphasia that includes 40 items distributed in six sections, namely: 1) Internal language, ability to inhibit and discourse. 2) Control of concurrent semiotic procedures. 3) Paraphrastic skills and associated phenomena. 4) Say referral and associated phenomena. 5) Monitoring capacity. Contextualization marks. 6) Displaced Uses of Language and Theory of Mind (ToM). Based on this initial evaluation, the patient's level of functioning was analyzed and the speech and language intervention program was designed taking into consideration the particular profile of the individual case under study. The general objective was oriented to improve oral communication and linguistic functioning. The specific objectives selected were: improving oral motor skills, ToM skills, lexical access, recent memory, oral expression and the ability to read the context. Also different materials and strategies focused on these areas were organized. The designed plan was applied over eighteen months (between December 2016 and January 2018), in a forty-five minute weekly session. Exercises were delivered each week at home. A second assessment was made six months later and a third was developed after 18 months of treatment. The results obtained were compared and analyzed from a qualitative as well as a quantitative point of view. Result(s): The results show that these tests are useful to determine the cognitive-linguistic deficits in patients with NF-PPA and also serve as a basis for the scaffolding of linguistic and cognitive rehabilitation. The patient improved his ability to nominate and in the articulation of two-syllabic words, verbal fluency maintained the same level and some skills worsened as it was the case of the understanding of complex oral texts and the use of grammatical elements, in their oral and written expression. Regarding cognition, there was an improvement in the visuospatial skills, but a marked deterioration in recent memory. The patient also presents a limited level of communication due to severe difficulties in oral expression compensated by using isolated words at low speed or writing very short messages. With respect to the scores obtained when evaluating the patient with MetAphAs, statistically significant differences were observed when comparing the scores obtained in July 2016 with those obtained in December 2016 or January 2018. No statistically significant differences were observed when comparing the scores obtained in December 2016 and January 2018. That is, the patient made an improvement in the first half year of rehabilitation that is maintained for a year after. Conclusion(s): This case study shows that patients with NF-PPA can improve their linguistic-cognitive functioning, but it is necessary to use tests that are useful to establish the initial profile of functioning, aspect absolutely necessary in the selection of the ideal objectives of the intervention program.Key words: Non-Fluent Primary Progressive Aphasia, assessment, speech-language intervention.
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115. **Bolton community stroke team computer and conversation group for individuals with post-stroke aphasia**

Chalmers S., Adamson R. 2018

Introduction: Aphasia is an acquired language disorder resulting from damage to areas of the brain responsible for language, for example following cerebrovascular accident (CVA). Aphasia can affect understanding, expression, reading and writing, and impact everyday activities, roles and relationships. Speech and language therapists (SLTs) in Bolton have previously conducted separate computer therapy and group therapy sessions with positive feedback. This project evaluated a new structured therapy program combining computer tasks and supported communication in order to improve conversations of PWA. Method(s): The group consisted of 1 hour of computer therapy using specialised SLT iPad applications individually tailored to each patient. Computer therapy was followed by 1 hour of conversation group therapy per week for 6 weeks. A structured conversation therapy programme was developed to facilitate supportive conversational techniques between individuals. The group was facilitated by 2 SLTs, a therapy assistant and a volunteer. Result(s): Outcomes were measured pre and post group therapy using individualised SMART goals, Therapy Outcome Measures, Communication Outcome After Stroke (COAST) scale and the NHS Friends and Family Test. In total 83% of individual goals were achieved. On average patients reported improvements in the areas specifically targeted during the group, as indicated by an increase score using the rating scale. Conclusion(s): The combination of both computer and conversation therapy enabled targets to be achieved such as communicating with unfamiliar people, communicating in a group and having confidence within social conversations. Technology successfully enabled access to functional activities relating to individual interests and hobbies.
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116. **Computer-based treatment of poststroke language disorders: a non-inferiority study of telerehabilitation compared to in-person service delivery**

Meltzer J. A., Baird A. J., Steele R. D., Harvey S. J. 2018

Background: Telerehabilitation promises to greatly expand access of underserved populations to speech therapy, but concerns remain about the effectiveness of services delivered remotely compared to in-person treatment. Aim(s): To evaluate the effectiveness of telerehabilitation, we conducted a randomized non-inferiority trial for chronic poststroke communication disorders, testing whether equivalent gains can be expected from in-person vs. telerehabilitative clinical service delivery, with both groups completing homework exercises outside of therapist contact time. Methods & Procedures: We treated 44 participants with aphasia or cognitive-linguistic communication disorder (CLCD). Treatment comprised tablet-based homework exercises and realistic, customized treatment plans tailored to the needs of each individual client. Clients had weekly 1-h sessions with the therapist over 10 weeks, with the interaction randomized to in-person and telerehabilitation conditions. Objective gains were assessed with the Western Aphasia Battery aphasia quotient (WAB-AQ) (for aphasia) and Cognitive-Linguistic Quick Test (CLQT) (for CLCD) and subjective gains with the Communication Confidence Rating Scale for Aphasia (CCRSA) (self-rating) and Communication Effectiveness Index (CETI) (partner rating). Outcomes & Results: Participants improved significantly on all of these measures, with statistically equivalent gains between in-person and telerehabilitation groups for WAB-AQ, CLQT, and CETI. Only the CCRSA showed an advantage for the in-person group. Gains on WAB-AQ were correlated with total time spent on offline exercises. Conclusion(s): Clinician-guided computer-based treatment is effective for producing widespread gains in language and communication skills in chronic stroke. Linguistic gains are equivalent whether clinician services are provided via telerehabilitation equipment or in person. Communicative confidence may still benefit from in-person treatment, reinforcing the need for social engagement in addition to deficit-focused linguistic treatment.
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117. **Development and evaluation of a mobile AAC: a virtual therapist and speech assistant for people with communication disabilities**
Wang E. -H, Zhou L., Chen S. -H K., Hill K., Parmanto B. 2018
PURPOSE: The currently existing Augmentative and Alternative Communication (AAC) technologies have limitations to produce the best communication rehabilitation outcomes and therefore a better solution is needed. METHOD(S): In this work, a mobile AAC app was developed based on results from research studies. Sophisticated AAC language programming, embedded training materials, and real-time communication performance reporting were integrated into the app. Two groups of study participants were recruited to participate a usability study and a preliminary feasibility study for the purpose of evaluating this mobile AAC app, respectively. RESULT(S): A tablet-based AAC app was developed to support communication rehabilitation. User studies of the app were conducted and included able-bodied individuals and people with verbal communication disabilities. All study participants agreed that the app establishes a usable alternative treatment protocol for communication rehabilitation. CONCLUSION(S): The app's integrated features have great potential to maximize users' communication effectiveness, enhance language skills, and ultimately improve users' quality of life. Implications for rehabilitation We have developed and evaluated an integrated mobile AAC language-based app. This tablet-based app integrated AAC with embedded trainings and real-time performance report.
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118. **Development of an English-language version of a Japanese iPad application to facilitate collaborative goal setting in rehabilitation: a Delphi study and field test**
William Levack Kounosuke Tomori Kayoko Takahashi Aidan J.Sherrington. 2018
Development of an English-language version of a Japanese iPad application to facilitate collaborative goal setting in rehabilitation: a Delphi study and field test. This study aimed to investigate the content of an English-language version of a Japanese iPad application designed to facilitate shared decision-making around goal setting in rehabilitation: Aid for Decision-making in Occupational Choice-English (ADOC-E). Phase 1: Delphi methods to reach consensus with an international group of expert occupational therapists on the text and images in ADOC-E. Phase 2: Testing correct recognition (unprompted and prompted) of images in ADOC-E by health service users in inpatient rehabilitation and residential care. Phase 1: International, online. Phase 2: Three healthcare services in New Zealand-(1) a residential rehabilitation service for traumatic brain injury, (2) a nursing home for frail older adults and (3) an inpatient rehabilitation ward in a public hospital. Phase 1: Fourteen experienced occupational therapists from New Zealand (4), Australia (4), UK (2) and USA (4). Phase 2: Twenty-four rehabilitation and residential care service users (10 men, 14 women; 20-95 years; Mini-Mental State Exam scores 13-30). Four Delphi rounds were required to reach consensus with the experienced occupational therapists on the content of ADOC-E, ending with 100 items covering daily activities that people do and social roles they participate in. Ninety-five per cent (95/100) of ADOC-E items could each be correctly identified by over 80% of service user participants with either unprompted or prompted recognition. While a few of the more abstract concepts in ADOC-E (related to complex social roles) were less likely to be correctly recognised by all participants, the text and images ADOC-E were deemed to be fit for purpose overall and ready for future clinical testing.
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119. **Digital support in aphasia and apraxia of speech therapy using the example of the neolexon therapy system**
Spath M., Jakob H. 2018
Digital applications can significantly improve the treatment of patients with aphasia and apraxia of speech. On the one hand, they can increase therapy frequency to a considerable extent. On the other hand, digital support systems may improve the individualization of speech materials. Therefore, the neolexon therapy system was developed by the working group "Entwicklungsgruppe Klinische Neuropsychologie." From a database of currently more than 7,500 words, therapists can create individual word sets for every patient according to linguistic difficulty and relevance to the patient. These word sets can be practiced during therapy sessions using a therapy app. I addition, the selected materials can be transferred to an easytouse patient app, allowing patients to continue training independently at home.Copyright © Hippocampus Verlag 2018.
http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed19&NEWS=N&AN=622417045 this link
http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed19&NEWS=N&AN=622417045 this link
120. **Effects of a Tablet-Based Home Practice Program With Telepractice on Treatment Outcomes in Chronic Aphasia**
Kurland J., Liu A., Stokes P. 2018
Purpose: The aim of this study was to determine if a tablet-based home practice program with weekly telepractice support could enable long-term maintenance of recent treatment gains and foster new language gains in poststroke aphasia. Method(s): In a pre-post group study of home practice outcomes, 21 individuals with chronic aphasia were examined before and after a 6-month home practice phase and again at follow-up 4 months later. The main outcome measure studied was change in naming previously treated or untreated, practiced or unpracticed pictures of objects and actions. Individualized home practice programs were created in iBooks Author with semantic, phonemic, and orthographic cueing in pictures, words, and videos in order to facilitate naming of previously treated or untreated pictures. Result(s): Home practice was effective for all participants with severity moderating treatment effects, such that individuals with the most severe aphasia made and maintained fewer gains. There was a negative relationship between the amount of training required for iPad proficiency and improvements on practiced and unpracticed pictures and a positive relationship between practice compliance and same improvements. Conclusion(s): Unsupervised home practice with weekly video teleconferencing support is effective. This study demonstrates that even individuals with chronic severe aphasia, including those with no prior smart device or even computer experience, can attain independent proficiency to continue practicing and improving their language skills beyond therapy discharge. This could represent a low-cost therapy option for individuals without insurance coverage and/or those for whom mobility is an obstacle to obtaining traditional aphasia therapy.
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121. **Improved language in chronic aphasia after self-delivered iPad speech therapy**
Stark Brielle C., Warburton Elizabeth A. 2018
Self-delivered speech therapy provides an opportunity for individualised dosage as a complement to the speech-therapy regime in the long-term rehabilitation pathway. Few apps for speech therapy have been subject to clinical trials, especially on a self-delivered platform. In a crossover design study, the Comprehensive Aphasia Test (CAT) and Cookie Theft Picture Description (CTPD) were used

to measure untrained improvement in a group of chronic expressive aphasic patients after using a speech therapy app. A pilot study (n = 3) and crossover design (n = 7) comparing the therapy app with a non-language mind-game were conducted. Patients self-selected their training on the app, with a recommended use of 20 minutes per day. There was significant post-therapy improvement on the CAT and CTPD but no significant improvement after the mind-game intervention, suggesting there were language-specific effects following use of the therapy app. Improvements on the CTPD, a functional measurement of speech, suggest that a therapy app can produce practical, important changes in speech. The improvements post-therapy were not due to type of language category trained or amount of training on the app, but an inverse relationship with severity at baseline and post-therapy improvement was shown. This study suggests that self-delivered therapy via an app is beneficial for chronic expressive aphasia.
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122. **Mobile technology to support lexical retrieval during activity retell in primary progressive aphasia**
Mooney Aimee, Bedrick Steven, Noethe Glory, Spaulding Scott, Fried-Oken Melanie. 2018
Background: Augmentative and alternative communication (AAC) strategies and tools developed for individuals with chronic aphasia have been found to facilitate generative language skills. There exists a need to identify effective AAC strategies and tools for individuals experiencing primary progressive aphasia (PPA), a neurodegenerative dementia, for which compensatory treatment paradigms are yet to be systematically evaluated. Aims: To examine the treatment effects of a novel language compensation tool, CoChat, and to determine if lexical retrieval skills improve are maintained during activity retell with use of this AAC application. Methods and procedures: Six individuals with PPA participated. The study was implemented using a single-subject alternating treatments experimental design to compare lexical retrieval during activity retell in three conditions: Absence of technology support, presence of photos only, and presence of CoChat app, with photo and labels. The number of target words produced by the participant during activity retell with a conversation partner was the primary dependent variable. There were two phases of this experiment: Three conditions presented in a fixed-order and three conditions presented in a counterbalanced order. For one participant, an additional implementation of CoChat was piloted at 6- and 9-month post-intervention to examine sustained effect of CoChat during activity retell. Outcomes and results: In the fixed-order phase, results indicated a higher number of target words produced in the CoChat condition for all participants. In the counterbalanced phase, results indicated a higher number of target words in the CoChat condition for two-thirds of the participants. Maintenance probes showed same level of lexical retrieval at 6 and 9 months following intervention. Conclusions: This single-case research design demonstrated that mobile technology compensatory strategies provide necessary support during natural conversations about personally relevant topics for people with PPA. CoChat, a newly developed mobile technology research app that uses social networks and an NLP engine to create a co-constructed external lexicon with visual scene display, significantly increased lexical retrieval during activity retell. Future research should further develop AAC strategies and tools that aid in maintenance of vocabulary access and communication participation for people with PPA over the course of disease progression.
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123. **More Than an AAC Device?**
LANDON MARIA. 2018
The article discusses the pros and cons of using a tablet computer other than as an augmentative/alternative communication (AAC) device for students with speech problems. Topics discussed include the various mobile applications that can be added to iPads and tablet computers that are not related to communication learning, the skills that a student should have to ensure that he can use the tablet for purposes other than communication and the alternative solutions to using a multi-purpose AAC.
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124. **Neolexon: Support per tablet for speech therapy**
Heide J. 2018
http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed19&NEWS=N&AN=626266142 this link
http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed19&NEWS=N&AN=626266142 this link

125. **Patient engagement with rehabilitative therapy programmes: therapist strategies and affecting influences**
Winkle K., Turton A., Caleb-Solly P., Bremner P. 2018
Background: Rehabilitation programmes increasingly rely on patients undertaking self-directed exercises at home. Low adherence to such exercises is a known issue. This study of therapists' experience aimed to identify patient factors that might influence engagement in self-directed exercises and to understand the strategies therapists use to promote adherence. Method: Eight independent practitioner therapists (three physio, two Occupational, and three speech) participated in semi-structured interviews. Interviews included discussion of two of the therapist's anonymized patient cases and a previously published motivation categorization tool. Interviews were audio-recorded, transcribed in full and analysed using framework methods. The framework was developed by two researchers. Ethical approval was obtained from the Faculty Ethics Committee. Results/Findings: Factors affecting engagement were recognized as being individual to different patients. All participants recognized their role in affecting patient engagement. Two key themes were identified: improving motivation and facilitation. Strategies for improving motivation included reflecting on progress, giving meaningful positive feedback, and making the exercises enjoyable. Facilitation was linked with assistance in scheduling practice sessions, the use of apps for reminders and guidance, and the recording of practice. Participants adapted their approach (e.g. language choices, amount and nature of information given, feedback style) to respond to different traits of patients. Key patient traits identified included previous activity level, employment status, cognition, motivation, social support, and functional goals. Conclusion: Therapists considered a personalized approach to therapy important for patient engagement. Factors affecting engagement vary across individuals; however, it is possible to identify some key patient traits and resulting changes to therapists' approach.
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126. **Recovernow: A Multicentre Of Tablet-Based Speech Therapy For Post-Stroke Aphasia**
Anon. 2018
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127. **The Accuracy of Smartphone Sound Level Meter Applications With and Without Calibration**

Serpanos Yula C., Renne Brittany, Schoepflin Janet R., Davis Diane. 2018

Purpose: The purpose of this study is to determine the accuracy of smartphone sound level meter applications (SLMAs) with calibration features across stimulus levels and for ambient room noise measures in the clinical setting. Method: The accuracy of 3 iOS-based smartphone SLMAs (SLMA1: Analyzer Version 2.7.2, DSP Mobile], SLMA2: Sound Level Meter Pro Version 2.2, Mint Muse LLC], and SLMA3: SPL Meter Version 9.3, Andrew Smith, Studio Six Digital]), using a single smartphone device (iPhone 6S Model A1688, iOS 9.3.4, Apple), was evaluated with and without calibration using a 1000-Hz narrowband noise (NBN) and white noise (WN) stimuli over a range of sound levels (20-100 dB) and in ambient noise measures of 8 speech and hearing room environments. A simultaneous and corresponding SLMA and Type 1 sound level meter (SLM) measure per condition were documented with a photo image; each condition was replicated 5 times. Mean SLMA and SLM measures were compared. SLMA measures were considered accurate if within ± 2 dB of the SLM. Results: Measures of NBN and WN signals using these SLMAs were accurate at levels above 40-50 dB when calibrated. NBN and WN signals using some SLMAs were significantly (p 40 to 50 dB. SLMA measures with or without calibration adjustment were inaccurate and overestimated room ambient noise levels < 50 dB. Conclusions: These findings suggest that some SLMAs are accurate for measuring NBN and WN stimuli within the range of 50-100 dB in sound-treated environments when calibrated. However, outcomes indicated that some SLMAs, even with calibration, overestimated low ambient noise levels and may not accurately verify quiet room environments < 50 dB for clinical services. These results should not be generalized for all smartphone types, and continued research on SLMAs using next-generation smartphone devices is warranted.

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128. **The effectiveness of Lee Silverman Voice Treatment therapy issued interactively through an iPad device: A non-inferiority study**

Griffin Murray, Bentley John, Shanks Joseph, Wood Carly. 2018

Introduction This study compared the differences in recorded speech variables between people treated with conventional 'in person' Lee Silverman Voice Treatment (LSVT) and those treated remotely via iPad-based 'Facetime'. Method Eight participants were selected for the iPad LSVT, and 21 similarly matched subjects were selected from existing data to form the 'in person' group. Participants in both groups had diagnosed idiopathic Parkinson's disease and moderate hypokinetic dysarthria. Eighteen sessions of prescribed LSVT comprising a pre-treatment assessment, 16 treatment sessions, and a six months' post-treatment assessment were administered for each person. In both groups, pre- and post-treatment assessments were conducted face-to-face. Performance measures were recorded during assessment and treatment. Average measures were determined for all tasks at all time points and a summary outcome variable was composed from across-task performance. Results Non-inferiority testing confirmed that iPad LSVT was non-inferior in treating all LSVT task 3 variables except generating words, with the 90% upper confidence intervals (CI) lying between the non-inferiority margin of ± 2.25 and zero. The iPad was superior in treating the task 3 rainbow reading passage and describing motor task variables with upper and lower 90% CI values being negative. The improvement in the summary outcome variable score was also superior in the iPad group. Discussion Non-inferiority testing implies that the iPad LSVT is non-inferior in treating task three variables when compared to traditional LSVT. The study supports further development of remote delivery solutions involving the Apple iPad and 'Facetime' system as a means of improving access to services and the participant's experience.

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129. **An individualized super-Gaussian single microphone Speech Enhancement for hearing aid users with smartphone as an assistive device**

Chandan K. A Reddy Nikhil Shankar Gautam S. Bhat Ram Charan Issa Panahi. 2017

An individualized super-Gaussian single microphone Speech Enhancement for hearing aid users with smartphone as an assistive device In this letter, we derive a new super Gaussian Joint Maximum (SGJMAP) based single microphone speech enhancement gain function. The developed Speech Enhancement method is implemented on a smartphone, and this arrangement functions as an assistive device to hearing aids. We introduce a "" parameter in the derived gain function that allows the smartphone user to customize their listening preference, by controlling the amount of noise suppression and speech distortion in real-time based on their level of hearing comfort perceived in noisy real world acoustic environment. Objective quality and intelligibility measures show the effectiveness of the proposed method in comparison to benchmark techniques considered in this paper. Subjective results reflect the usefulness of the developed Speech Enhancement application in real-world noisy conditions at signal to noise ratio levels of -5 dB, 0 dB and 5 dB.

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#	Query	Results
S16	S8 AND S15	24
S15	S10 OR S11 OR S12 OR S13 OR S14	171,085
S14	TI (neuro* rehab* or neurorehab*) OR AB (neuro* rehab* or neurorehab*)	2,969
S13	TI (traumatic brain injur* or TBI) OR AB (traumatic brain injur* or TBI)	20,314
S12	(MH "Brain Injuries+")	33,346
S11	TI (stroke* or cerebrovascular accident* or CVA) OR AB (stroke* or cerebrovascular accident* or CVA)	115,340
S10	(MH "Stroke+")	79,668
S9	S3 AND S7	118
S8	S3 AND S7	281
S7	S4 OR S5 OR S6	17,075
S6	TI (SLT or SLTs) OR AB (SLT or SLTs)	1,062
S5	TI ((speech* or speak* or language* or linguistic* or talk*) n3 (therap* or rehab* or treat*)) OR AB ((speech* or speak* or language* or linguistic* or talk*) n3 (therap* or rehab* or treat*))	8,598
S4	(MH "Rehabilitation, Speech and Language+")	9,958
S3	S1 OR S2	38,134
S2	TI (ipad* or i-pad* or app or apps or smartphone* or smart phone* or iphone* or i-phone* or smartdevice* or smart device* or tablet*) OR AB (ipad* or i-pad* or app or apps or smartphone* or smart phone* or iphone* or i-phone* or smartdevice* or smart device* or tablet*)	33,434
S1	(MH "Computers, Hand-Held+")	8,677

Medline searched via Ovid:
Ovid MEDLINE(R) ALL <1946 to March 07, 2023>
1 exp Computers, Handheld/ 12628
2 (ipad* or i-pad* or app or apps or smartphone* or smart phone* or iphone* or i-phone* or smartdevice* or smart device* or tablet*).ti,ab. 119540
3 1 or 2 122971
4 exp "Rehabilitation of Speech and Language Disorders"/ 11536
5 ((speech* or speak* or language* or linguistic* or talk*) adj3 (therap* or rehab* or treat*)).ti,ab. 11208
6 (SLT or SLTs).ti,ab. 2645
7 4 or 5 or 6 21730
8 3 and 7 141
9 limit 8 to yr="2018 -Current" 87
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3 1 or 2 183140
4 exp *"speech and language rehabilitation"/ 6717
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6 (SLT or SLTs).ti,ab. 3976
7 4 or 5 or 6 25305
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3 1 or 2 37358
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6 (SLT or SLTs).ti,ab. 1142
7 4 or 5 or 6 9916
8 3 and 7 92
9 limit 8 to yr="2018 -Current" 54
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AMED searched via Ovid:
AMED (Allied and Complementary Medicine) <1985 to February 2023>
1 exp computers/ 1829
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3 1 or 2 2798
4 exp language therapy/ or exp speech therapy/ 1323
5 ((speech* or speak* or language* or linguistic* or talk*) adj3 (therap* or rehab* or treat*)).ti,ab. 1131
6 (SLT or SLTs).ti,ab. 57
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ProQuest:
(MAINSUBJECT.EXACT("Speech therapy") OR MESH.EXACT("Rehabilitation of Speech and Language Disorders") OR tiab((speech* OR speak* OR language* OR linguistic* OR talk*) NEAR/3 (therap* OR rehab* OR treat*))) AND (tiab(ipad* OR i-pad* OR app OR apps OR smartphone* OR smart phone* OR iphone* OR i-phone* OR smartdevice* OR smart device* OR tablet*) OR MAINSUBJECT.EXACT("Smartphones") OR MJMESH.EXACT("Computers, Handheld"))Limits applied = last 5 years

Databases:

7 databases searched

Hide list

- APA PsycArticles®
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- Health Research Premium Collection
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Trip Database:
https://www.tripdatabase.com/Searchresult?criteria=speech%20OR%20speak%20OR%20language%20OR%20talk%20OR%20slt%20OR%20slts%20OR%20linguistic&intervention=ipad%20OR%20i-pad%20OR%20smartphone%20OR%20smart-phone%20OR%20tablet%20OR%20app%20OR%20apps&comparison

Google: ipads for speech and language therapy - Google Search

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