

Digital postural management platform for remote seating assessment and real-time postural adjustments.

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Summary

This paper outlines current trends, limitations and the opportunities for internet connected solutions in remote postural assessment and management. Followed by an introduction to Aergo Health’s technical exploration in developing a digital postural management platform that enables real-time assessment and adjustment for therapists managing seating needs of wheelchair users.

Aims and Objectives

Our aim was to develop a digital postural management portal for therapists to remotely monitor client’s seating needs (post in-person assessment) and make real-time adjustment to client’s posture.

Our objective is to enable therapists to have a high level of intervention through a digital control interface coupled with internet connected postural support air modules.

Background

The impact of COVID-19 has led to a decrease in healthcare access for existing and new wheelchair users who are categorised as at high risk of developing severe illnesses from the virus. Staff shortages across the NHS have further exacerbated accessibility to clinical support. In order to overcome this, conference calls and telehealth technology have been widely adopted to provide care and treatments remotely.

An international survey with over 1000 therapists has found the pandemic has increased the integration of telehealth in their clinical practices by 66% (Chantal Camden & Mindy Silva 2021). Video platforms such as Zoom, Microsoft Teams, and Attend Anywhere are commonly used for remote patient-screening and follow-up appointments. Although further studies have shown that the increase of telehealth usage has improved patient satisfaction and case-load managements, not all physical assessments are easily replicated remotely.

Highlights from “Telehealth for the Provision of Occupational Therapy: Reflections on Experiences During the COVID-19 Pandemic”: The findings below are outcomes from the surveys conducted with 230 Occupational Therapist Practitioners (OTPs) across 4 states in the United States. (Dahl-Popolizio, Sue et al., 2020)



Percent of the Populations or Conditions with whom Telehealth was Effective

Percentages for Interventions that were Effectively Used via Telehealth

Wheelchair and seating prescription are intrinsically complex and require therapists to conduct extensive in-person assessment in order to provide the correct equipment. Often, finding the right postural support for paediatric wheelchair users is especially challenging as their bodies and needs change so quickly. Findings from an equivalency study in Telerehabilitation for wheeled mobility and seating assessments found that effectiveness between in-person and telehealth treatments were highly comparable (Schein et al., 2010). Leading wheelchair manufacturer, Permobil, stated that 10,000 users of their power wheelchairs have activated internet connection in their wheelbases for remote technical diagnosis. Research and Development in internet connected specialist equipment is on the rise, and the benefits of connecting clinicians and trained technicians to users’ wheelchairs and equipment will benefit remote clinical support significantly.

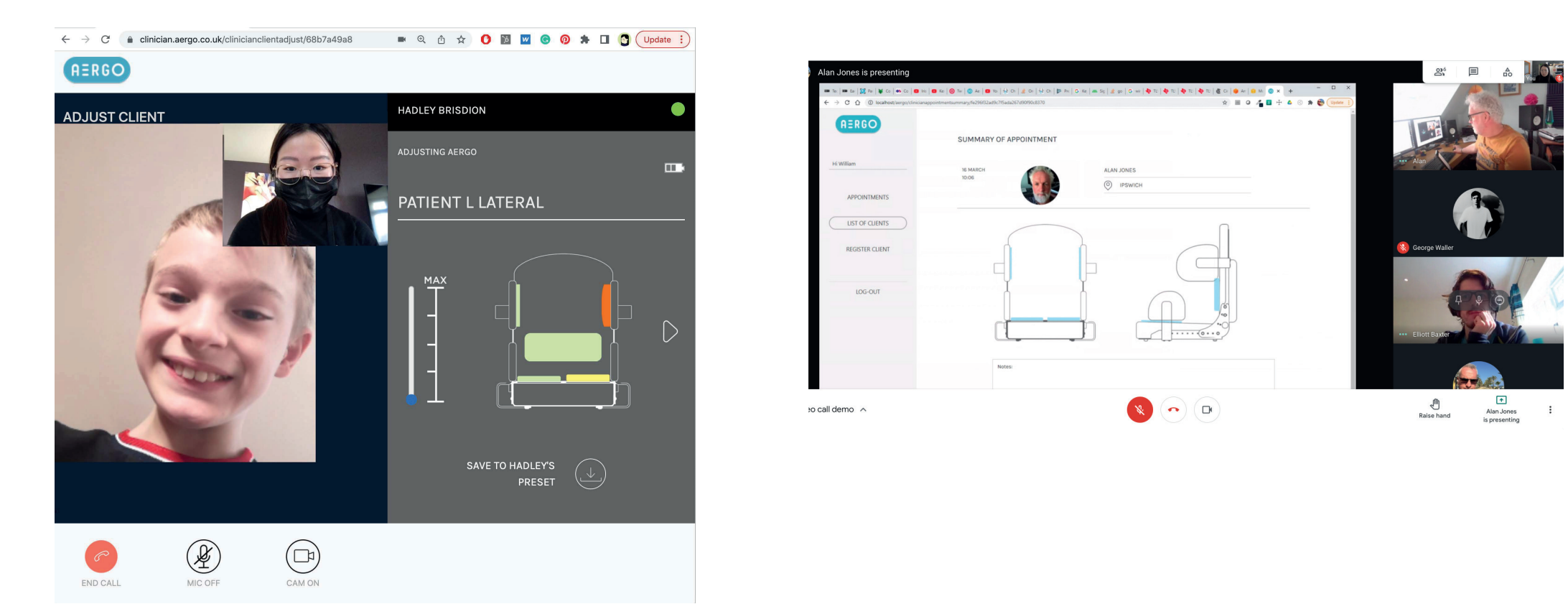
Technique

Primary interviews were conducted with wheelchair service occupational therapists through conference calls. A series of open questions were asked to understand the changes in the therapist’s clinical practice and experience with integrating telehealth into assessments and routine check-ups with clients. The qualitative feedback provided insights that led us to create user requirement documentation and informed our software feature list.

To bridge the gap between digital and in-person assessment requirements for wheelchair equipment provision, Aergo Health has developed a clinician web portal that connects therapists to their client’s Aergo PS seating system. The web portal is

designed to facilitate collaborative postural management between wheelchair users, carers and their therapist.

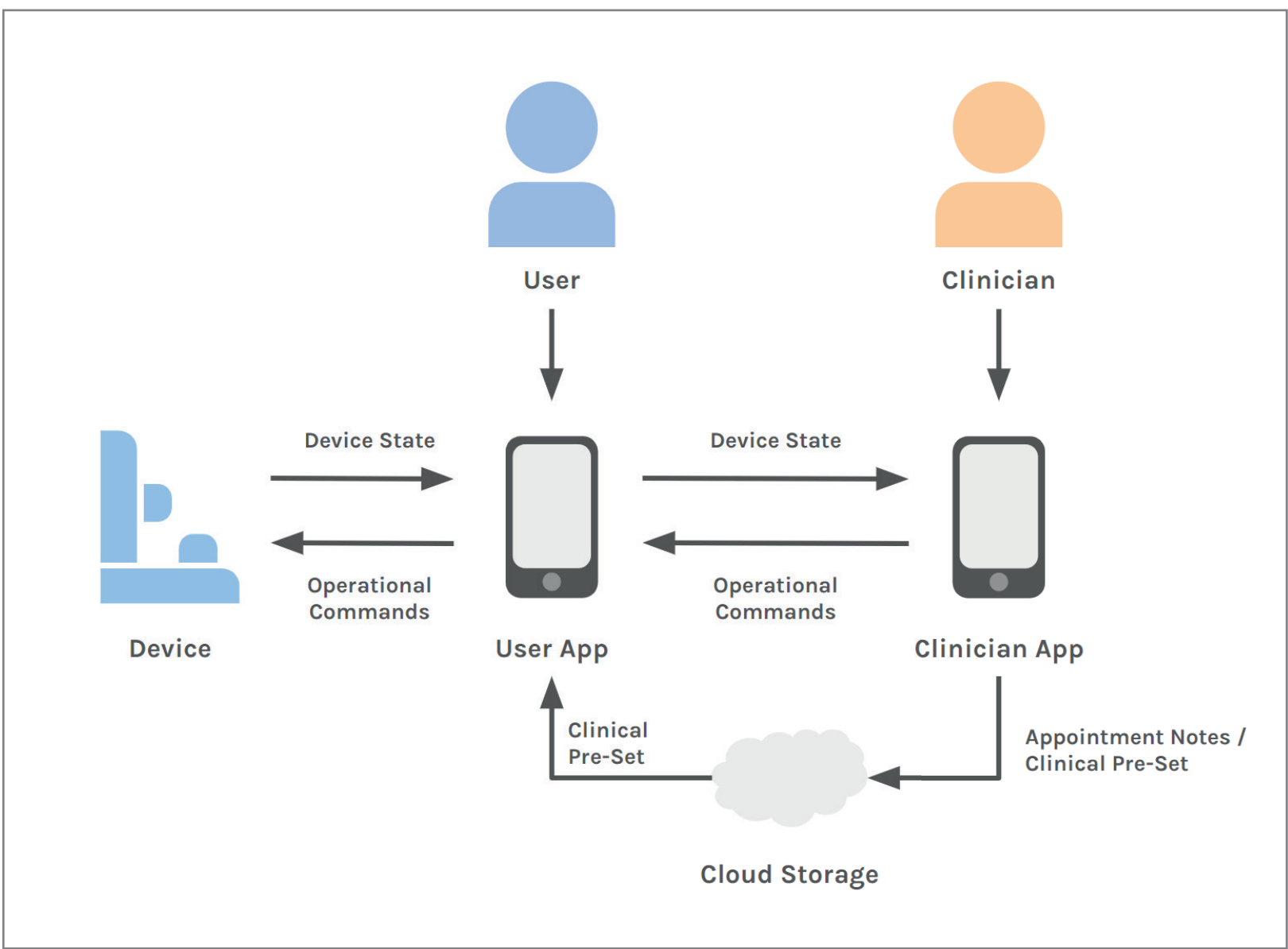
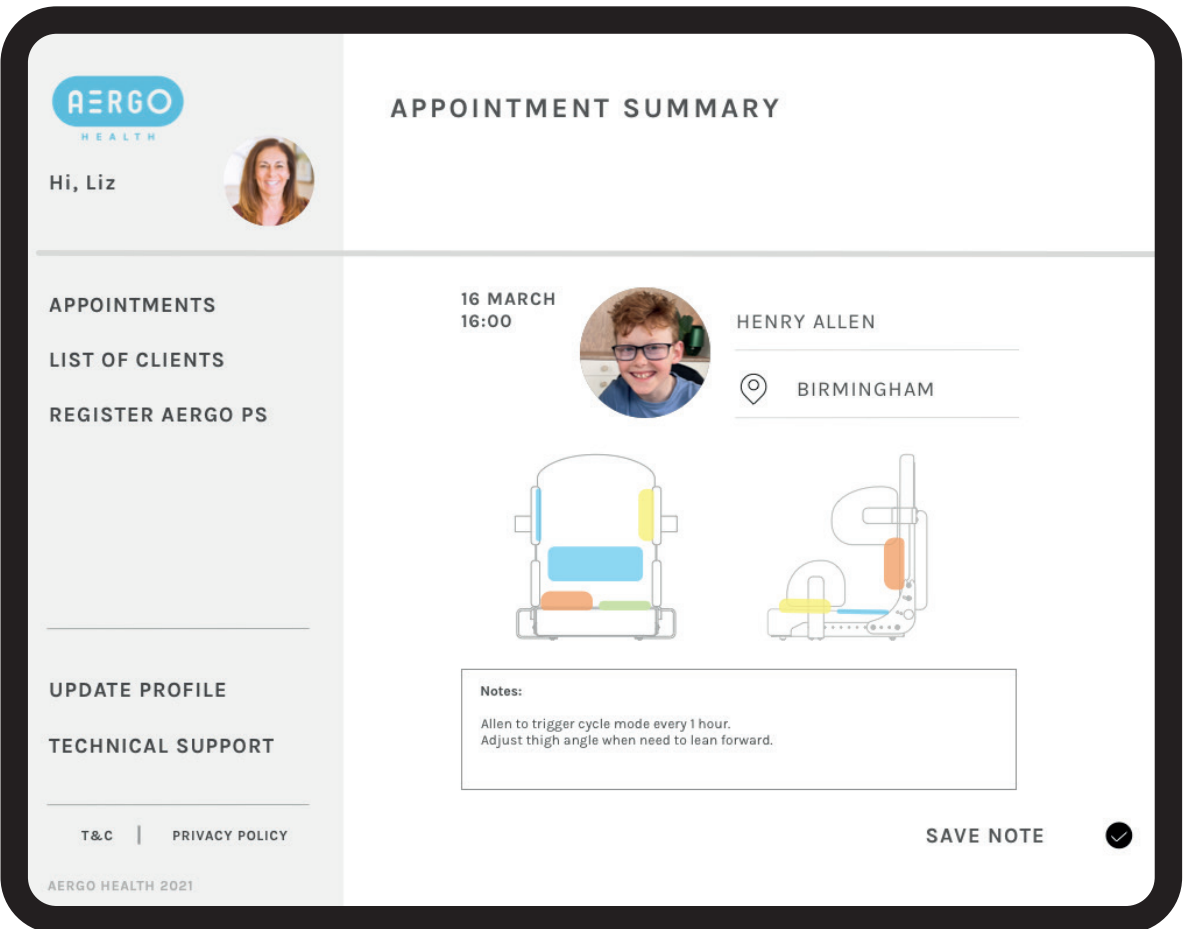
The Aergo Clinician web portal provides a unique conference call facility that not only uses video call features to capture a user’s seating position and feedback, but also visually displays the user’s real-time pressure data to inform sitting position and comfort of the user. A user-friendly control panel is included to enable real-time adjustments of individual air supports within the client’s Aergo PS.



Screen capture of early Aergo clinician portal prototypes and remote user tests during the pandemic.

Result & Testing

Observational studies have been conducted between therapists and wheelchair users to evaluate usability and stability of the Aergo Clinician web portal. The result demonstrated ease of use and effectiveness in fine-tuning a user’s postural support system to ensure the equipment set up continues to support the client effectively.



Aergo Digital Platform flow diagram

Aergo Clinician Portal Final Design: Remote postural support adjustment page (Left), Appointment summary page (Right).

Discussion

Although observational studies have demonstrated promising potential of digital postural management by enabling remote control of the Aergo PS system through the web portal, there are still limitations particularly with initial equipment set-up and body measurements for clients with complex seating needs. Initial feedback has suggested the key benefit of the web portal in clinical practices is the ability to track adherence and make minor adjustments to the equipment quickly and frequently, whilst avoiding the need to travel for a physical meeting. Aergo Heath will expand the data points for therapists to accurately conduct remote assessment and rehabilitation. Future development could include diagnostic tools using Augmented Reality body mapping and integrated high fidelity pressure mapping to better inform the user’s sitting position.

Standards/Guidelines

IEC 62304 Medical device software
IEC 62366-1:2015 Medical devices

References

Chantal Camden & Mindy Silva (2021) Paediatric Telehealth: Opportunities Created by the COVID-19 and Suggestions to Sustain Its Use to Support Families of Children with Disabilities, Physical & Occupational Therapy In Paediatrics, 41.1, 1-17, DOI: 10.1080/01942638.2020.1825032

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