

Telepractice in Audiology

Emma Rushbrooke, MPhil(AUD), BA, DipAud.,
MAudA., LSLS. Cert. AVT, RNC

K. Todd Houston, PhD, CCC-SLP, LSLS Cert. AVT



Contents

<i>Foreword by Louise Hickson, BSpThy(Hons), MAud, PhD</i>	<i>vii</i>
<i>Acknowledgments</i>	<i>ix</i>
<i>Contributors</i>	<i>xi</i>
1 History, Terminology, and the Advent of Teleaudiology <i>Emma Rushbrooke and K. Todd Houston</i>	1
2 Models of Service Delivery: What Should We Consider? <i>Emma Rushbrooke</i>	23
3 Evaluating the Benefits of a Telepractice Model <i>Colleen Psarros and Catherine M. McMabon</i>	47
4 Remote Programming of Cochlear Implants <i>Colleen Psarros and Emma van Wanrooy</i>	91
5 Remote Diagnostic Hearing Assessment <i>Robert H. Eikelboom and De Wet Swanepoel</i>	123
6 Remote Hearing Aid Fittings <i>David A. Fabry</i>	141
7 Telerehabilitation in Audiology <i>Michelle von Muralt, Lynda Farwell, and K. Todd Houston</i>	153
8 Potential for Telepractice in Audiology: A Review of Applications in Early Hearing Detection and Intervention Programs <i>Emma Rushbrooke and Beth Atkinson</i>	189
9 Maximizing Professional Development Opportunities Using Telepractice <i>Jackie Brown and Carolyn Evans</i>	205
10 From Research to Clinical Practice: What Should We Consider? <i>Gabriella Constantinescu and Dimity Dornan</i>	231

11 Future Directions in Teleaudiology <i>De Wet Swanepoel and Robert H. Eikelboom</i>	247
Appendix A. Participant Survey: eLearning Courses	263
<i>Index</i>	271



Foreword

The emergence of telepractice in audiology represents a major change in audiological practice; in fact, it is the single biggest change that I have observed in my 35-year professional career. Telepractice has the potential to radically alter existing service delivery systems, to provide audiology services to millions who would otherwise not have benefited from them, and, importantly, to improve the level of re/habilitation for people with hearing loss around the world.

Although extremely important for developing countries that are underserved by professional services and for countries like Australia where the tyranny of distance means that professional services do not reach all those in need, its application is not limited to such environments. Adults and children living in urban areas in developed countries can also benefit from rapid, easy access to high-quality audiological support.

Thus, the emergence of this first book on *Telepractice in Audiology* is incredibly timely. I do understand, however, that change can be threatening in many ways, and there are consumers, clinicians, researchers, and policy makers who are concerned about the new practice and how it will work for them. I would encourage all to heed the words of Mahatma Gandhi, who encouraged us to become actively involved in change; he said, "Be the change that you wish to see in the world."

The first change management step in adopting a new mode of practice is to gain knowledge about the new practice, and this book is an outstanding source of information for that knowledge. It brings together details about the history of telepractice in audiology; existing telepractice in diagnosis, hearing aid fitting, cochlear implant mapping, and re/habilitation; methods of evaluating the outcomes of telepractice in audiology; and the potential for future telepractice applications.

The book is edited by clinicians/researchers with extensive expertise in this field: Emma Rushbrooke and Todd Houston. I have known Emma since she first studied audiology at the University of Queensland and, in recent years, I supervised her

excellent research master's study that evaluated the validity of remote cochlear implant mapping for children. Both Emma and Todd are committed to developing the evidence base needed to underpin telepractice in audiology, and in this book, they have gathered together an outstanding team of contributing authors to provide that evidence.

Finally, I recommend this book to consumers, clinicians, researchers, and policy makers—the change to telepractice in audiology is upon us, and reading this book will help us all to be a part of that change.

—Louise Hickson, BSpThy(Hons), MAud, PhD
Head, School of Health and Rehabilitation
Sciences
Professor of Audiology, Co-Director,
Communication Disability Centre
The University of Queensland, Australia



Acknowledgments

The process of creating a new book is challenging but, instilled in the process, is the shared focus of so many talented individuals. We have thoroughly enjoyed the opportunities to collaborate and learn from all who lent their time and expertise to ensure that we produced an excellent book on the topic of *Telepractice in Audiology*.

To that end, we wish to extend our deepest appreciation to our international cast of contributing authors who so generously gave their time and shared their knowledge and experience in the area of telepractice. We believe that many will benefit from your insights and will be inspired to incorporate telepractice into their service provision.

We also would like to sincerely thank the editors and staff at Plural Publishing, especially Valerie Johns, Rachel Singer, Megan Carter, Kalie Koscielak, and Alya Hameed for their guidance and support from the development of the initial concept of the book through the writing, editing, and production processes. We appreciated your encouragement, patience, and consistent professionalism.

Contributors

Beth Atkinson, BSpPath, MAudSt, MAudA (CCP)

Clinical Manager

Audiology

Hear and Say

Brisbane, Australia

Chapter 8

Jackie Brown, BEd (Deafness Studies), DipTeach, LSLS Cert. AVT

Education and Development Manager

Hear and Say

Brisbane, Australia

Chapter 9

Gabriella Constantinescu, PhD, BSpPath (Hons)

Lecturer in Speech Pathology

School of Allied and Public Health

Faculty of Health Sciences

Australian Catholic University

Melbourne, Australia

Chapter 10

Dimity Dornan, AO, PhD UQ, HonDUniv USQ, BSpThy,

FSPAA, CpSp, LSLS Cert. AVT

Executive Director and Founder

Hear and Say

Associate Professor

University of Queensland

Associate Professor

Griffith University

Brisbane, Australia

Chapter 10

Robert H. Eikelboom, BEng, MAppSc, PhD

Adjunct Associate Professor

Ear Sciences Centre, School of Surgery

The University of Western Australia

Nedlands, Australia

Head eHealth Group
Ear Science Institute Australia
Subiaco, Australia
Extra-ordinary Professor
Department of Speech-Language Pathology and Audiology
University of Pretoria
Pretoria, South Africa
Chapters 5 and 11

Carolyn Evans, BSc, MAud, MAudA (CCP)
Audiologist
Hear and Say
Brisbane, Australia
Chapter 9

David A. Fabry, PhD
Vice President
Audiology and Professional Relations
Starkey Hearing Technologies
Minneapolis, Minnesota
Chapter 6

Lynda Farwell, BSpPath, LSLS Cert. AVT
Team Leader–Listening and Spoken Language
Hear and Say
Brisbane, Australia
Chapter 7

Catherine M. McMahon, PhD
Associate Professor
Head of Audiology
Department of Linguistics
Macquarie University
Sydney, Australia
Chapter 3

K. Todd Houston, PhD, CCC-SLP, LSLS Cert. AVT
Professor
School of Speech-Language Pathology and Audiology
College of Health Professions
The University of Akron
Akron, OH

Chapters 1 and 7

Colleen Psarros, BAppSc (SpPath), MSc(AUD), MAudA(CCP)

Clinical Practice and Strategy Manager
SCIC (an RIDBC service)
Gladesville, Sydney, Australia

Chapters 3 and 4

Emma Rushbrooke, MPhil(AUD), BA, DipAud., MAudA., LSLS Cert. AVT, RNC

Clinical Director
Hear and Say
Brisbane, Australia

Chapters 1, 2, and 8

Michelle von Muralt, BSpPath, LSLS Cert AVT

Team Leader–Listening and Spoken Language
Hear and Say
Brisbane, Australia

Chapter 7

De Wet Swanepoel, PhD

Professor
Department of Speech-Language Pathology and Audiology
University of Pretoria
Pretoria, South Africa
Adjunct Associate Professor
Ear Sciences Centre, School of Surgery
The University of Western Australia
Nedlands, Australia
Senior Research Fellow
Ear Science Institute Australia
Subiaco, Australia

Chapters 5 and 11

Emma van Wanrooy, BA, MAud, MAudA (CCP)

Audiologist
(Formerly at SCIC)
Pittwater Hearing
Avalon, Sydney, Australia

Chapter 4

This book is dedicated to all the children and families who benefit from Telepractice, and to my work colleagues whose passion and innovation constantly inspire me. Deep appreciation goes to my wonderful husband Darren, family and friends, whose unfailing understanding, encouragement and support have made this work possible. Lastly, to my ever faithful Milo, who waited patiently for walks and kept me company throughout—no matter what the time!

—Emma Rushbrooke

Like Emma, I'd like to dedicate this book to all of the children, families, and adults with hearing loss who continue to teach me so much about telepractice. I will remain eternally grateful for your patience and support as we work together to forge new ways of delivering vital services at a distance.

I also have to thank my colleagues on faculty in the School of Speech-Language Pathology and Audiology at the University of Akron for your willingness to tolerate my clinical and research interests in telepractice and hearing loss. As well, I must thank the dedicated graduate students in speech-language pathology that I have the honor and privilege to work beside every day. You continue to inspire me.

And finally, I'd like to thank my wife, Maria, for tolerating the long hours, distracted conversations, and my need to sit in front of my computer for extended periods of time. Thank you for being my partner in all of the things that matter in life.

—K. Todd Houston

7

Telerehabilitation in Audiology

***Michelle von Muralt, Lynda Farwell,
and K. Todd Houston***

Key Points

- Intervention and rehabilitation after fitting of hearing technology is essential to achieving the best communication outcomes for individuals with hearing loss.
- Services delivered through distance communication (e.g., telepractice, teleintervention, telerehabilitation) allow greater equity of access and a more flexible range of service options for children and adults with hearing loss.
- Telerehabilitation offers solutions to the barriers that children and adults with hearing loss experience when seeking out services with qualified professionals.
- Initial research into the satisfaction and outcomes achieved using a telepractice model of rehabilitation indicates that it is a viable and equitable service compared to face-to-face (i.e., in-person) intervention options.

The fitting of hearing technology is only the first step in facilitating a successful intervention process for children and adults with hearing loss. Habilitation or rehabilitation after fitting of hearing aids or implantable technologies (e.g., bone conduction implants, middle ear implants, and cochlear implants) is essential to maximize functional outcomes for each patient (Boothroyd,

2007; Moeller, 2010; Tye-Murray, 2009; Yoshinaga-Itano, Sedey, Coutler, & Mehl, 1998). To achieve optimal listening and spoken language outcomes after hearing technology is fitted, it is important that a patient engages with an experienced, trusted, and qualified habilitation professional to maximize his or her listening skills and communication (Estabrooks, Houston, & McIver-Lux, 2014; Gagne, 2000; Tye-Murray, 2009). This intervention should be provided by professionals with specific knowledge of, and training in (re)habilitation services for individuals with hearing loss (Houston, 2014a; Joint Committee on Infant Hearing [JCIH], 2007). Speech-language pathologists, teachers of the deaf, and audiologists are all able to offer habilitation services to children. Adults with hearing loss typically receive rehabilitation services from qualified speech-language pathologists and audiologists. Families of young children with hearing loss who have chosen a listening and spoken language approach, such as auditory-verbal therapy, may struggle to find local qualified providers who can deliver these services (Houston, 2014b; Houston, Munoz, & Bradham, 2011; Houston & Perigoe, 2010; JCIH, 2007). Similarly, adults with hearing loss may also find it challenging to enroll in aural rehabilitation services due to a lack of availability (Galvin, Case, & Houston, 2014; Montgomery & Houston, 2000). In many regions of the world, a shortage exists of hearing health care professionals (i.e., audiologists) (Swanepoel & Hall, 2010). Thus, professionals with appropriate training who can deliver (re)habilitation services to children and adults with hearing loss are not available in every community, which affects equity of access to quality in-person services. Additionally, committing to attend in-person rehabilitation is becoming increasingly difficult for many families due to distance or work-life constraints, including having time to travel to appointments (Hayes, Qu, Weston, & Baxter, 2011). It is paramount that service providers explore time and cost-effective methods, such as telerehabilitation, to offer more flexible and equitable services to all patients, especially when barriers caused by distance, lack of services, and challenging personal circumstances exist (American Speech-Language-Hearing Association [ASHA], 2005; Houston, 2014a; Theodoros, 2013).

Advances in computer and teleconferencing technology and global improvements in telecommunications and Internet

connections have allowed for the expansion of (re)habilitation services via telepractice. This chapter explores the potential for comprehensive (re)habilitation services for individuals with hearing loss to be provided at a distance through models of telerehabilitation. Over a decade ago, the ASHA published position statements and technical reports that supported telepractice as an appropriate service provision option for audiologists and speech-language pathologists. These policies noted that not all patients or treatments would be appropriate for telepractice service delivery models and that the quality of telepractice services must be equivalent to those services provided face-to-face (i.e., “in-person”) (ASHA, 2005).

In this chapter, barriers to patient participation in habilitation/rehabilitation services are explored, and telerehabilitation, as a service delivery model, is shown to provide greater equity of access for children and adults with hearing loss. Models of service delivery for providing auditory-verbal therapy and aural rehabilitation through telepractice are outlined. Case studies also have been included to demonstrate the diverse circumstances whereby telepractice may be utilized for aural (re)habilitation.

Why Rehabilitation Is Important

Rehabilitation is important for children and adults to achieve optimal outcomes with their hearing technology (Boothroyd, 2007; Moeller, 2010; Tye-Murray, 2009; Yoshinaga-Itano et al., 1998). The need for rehabilitation is not governed by the age or developmental stage of a person receiving hearing technology. The length and duration of engagement in a rehabilitation program will vary depending on the specific goals of the client/family. Appropriate counseling at the time of fitting the hearing technology is essential to ensure realistic expectations are established about outcomes and to obtain the client’s commitment to the rehabilitation process (Saunders, Lewis, & Forsline, 2009; Soman & Tharpe, 2012). Because hearing loss affects each member of the family in some way, clinical experience indicates the importance of a support person for both the pediatric and adult populations to assist and guide the individual with hearing

loss throughout the rehabilitation process (Towey, 2013). In the pediatric population, this person is likely to be a parent or caregiver. In the adult population, it is important that the client chooses someone who is trusted and able to assist with aural rehabilitation. This person also will provide emotional support. Without a support person, the journey from fitting to the functional use of hearing technology may be more challenging. Professionals providing rehabilitation services for children and adults with hearing loss need to work closely with audiologists to ensure optimal amplification and benefit of a person's hearing technology (Estabrooks et al., 2014). Without optimal amplification, rehabilitation will not achieve the best outcomes for listening and spoken language (Cole & Flexer, 2011).

In the pediatric population, several research studies have reported outcomes of optimal amplification and intervention using a listening and spoken language approach with children with hearing loss. When children with hearing loss are identified early, fitted with appropriate hearing technology, and provided with family-centered early intervention services from properly trained professionals, most are able to progress at age-appropriate rates (Kennedy et al., 2006; Moeller, 2000; Yoshinaga-Itano et al., 1998). More positive outcomes are associated with early identification and rehabilitation, including better language, speech, and social-emotional development than later-identified children; more typical rates of cognitive development; and lower parental stress as the child acquires language and increases communication (Dornan, Hickson, Murdoch, Houston, & Constantinescu, 2010; Geers, 2006; Niparko et al., 2010; Yoshinaga-Itano & Gravel, 2001).

Rehabilitation for adults with hearing loss is often referred to as aural rehabilitation and differs from the developmental approach used with children. Rehabilitation in the adult population targets optimizing a patient's participation in life activities and alleviating difficulties caused as a result of hearing loss (Boothroyd, 2007; Estabrooks et al., 2014; Gagne, 2000; Tye-Murray, 2009). It is essential to actively involve adult patients when planning rehabilitation sessions to ensure their rehabilitation aligns with their personal goals (Estabrooks et al., 2014; McConkey Robbins, 2009). Rehabilitation that does not interest an adult or does not target functional abilities may result in poor

attendance for sessions, reduced motivation, and noncompliance with using hearing technology. However, coupling the use of advanced hearing technology with aural rehabilitation services delivered by well-trained professionals can achieve improvement in auditory processing and comprehension (Houston, 2014b).

Terminology and Definitions: Telerehabilitation

Practitioners providing services to children and adults with hearing loss use a range of terms to describe the services that are delivered. Likewise, when these services are delivered using telecommunication technology via the Internet, additional terms are applied. The following list provides definitions of common terms practitioners use when engaged in aural (re)habilitation and telepractice/telerehabilitation.

- **Aural habilitation:** A term typically used to describe services provided to children with hearing loss, Tye-Murray (2015) defines it as “intervention for persons who have not developed and who are currently acquiring listening, speech, and language skills.”
- **Aural rehabilitation:** Intervention aimed at minimizing and alleviating the communication difficulties associated with hearing loss (Tye-Murray, 2015), typically used to describe services provided to adults with hearing loss.
- **Auditory-verbal therapy (AVT):** AVT is the application and management of hearing technology, in conjunction with specific strategies, techniques, and conditions, which promote optimal acquisition of spoken language primarily through individuals listening to the sounds of their own voices, the voices of others, and all sounds of life. Listening and spoken language become a major force in nurturing the development of the child’s personal, social, and academic life. When AVT is carried out with the necessary thoughtfulness, expertise, guidance, and love, most of these children develop excellent conversational competence (Estabrooks, 2012). Certified professionals in this approach are identified as listening and spoken language