



Institut Raymond-Dewar
Centre de réadaptation spécialisé
en surdité et en communication



Institut Nazareth
& Louis-Braille

Program for the prevention of falling by deaf-blind persons

by

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Agenda

- Background
- Program rationale
- Literature
- Client rehabilitation goals
- STAND UP™ program
- Clinical project and adaptations
- Measuring progress and observations
- Participant feedback
- Conclusions and future efforts

Background

- In 2005 two Montreal-area rehabilitation centers joined together to offer services to the deaf-blind
 - Institut Raymond-Dewar (deaf & hard of hearing)
 - Institut Nazareth et Louis-Braille (visual impaired)
- Chose an interdisciplinary approach
 - Provided multiple benefits
- Holistic approach focused on the needs of the client and his / her family

Background (cont')

- Institut Raymond-Dewar (IRD)
 - Program Head
 - Clinical Coordinator
 - Specialized educator
 - Social Worker
 - Speech-Language Pathologist
 - Audiologist
 - Psychologist
 - Secretary
- *21 employees in all*
- Institut Nazareth et Louis-Braille (INLB)
 - Orientation and Mobility Specialist
 - Specialist in Visual Impairment Rehabilitation
 - Computer communications
 - Home life and daily activities
 - Braille
 - Occupational therapist
 - Optometrist and optician

Background (cont')

- Statistics* for the deaf-blind program
 - 409 deaf-blind clients
 - 4 % children (0-12 years in age)
 - 6 % youth and young adults (13-25 years)
 - 40 % adults (26-65 years)
 - 28 % seniors (66-85 years)
 - 22 % seniors (86-101 years)
 - 91 cases of Usher syndrome
 - 28 with cochlear implants

* Open files in 2010

Background (cont')

- Four clientele profiles:
 - Congenital deaf-blind
 - Congenital blind, acquired hearing impairment
 - Congenital deaf, acquired visual impairment
 - Acquired hearing and visual impairment
- Various types of receptive and expressive communication
 - Oral, sign language, tactile sign language, lip reading
- Service area of Montreal and Western Quebec

Program rationale

- Why a fall prevention program for deaf-blind persons?
 - Many deaf-blind clients expressed fear of falling in their daily lives and during their travels

Literature

- Worldwide concern regarding the high prevalence of falls and injuries with the elderly
- Falling is a complex problem – multiple factors at work
- Elderly persons with visual impairments have an increased risk of falling
 - Couturier (2009)
- Very little literature on the application of a fall prevention program to the needs of deaf-blind persons

Literature (cont')

- Research has shown that falls are caused by a variety of factors
- World Health Organization (2007) ranks risk factors that may contribute to falls according to four aspects
 - Biological, behavioral, environmental and socio-economic

Literature (cont')

Source: World Health Organization (2007)

- **Biological**
 - Age; gender; health problems (e.g., osteoporosis, diabetes); fear of falling; decline in physical, cognitive or affective capacities; visual or auditory impairments; multiple or psychotropic medication usage; history of falls
- **Behavioral**
 - Lifestyle habits; lack of exercise or inactivity; excessive consumption of alcohol; poor nutrition; inadequate footwear
- **Environmental**
 - Insufficient lighting; slippery floors and stairs; lack of railings; cluttered areas / rights of way; cracks in the sidewalk / roadway
- **Socio-economic**
 - Low income and educational levels; isolation; limited access to health and social services

Literature (cont')

- “Vision impairment can be an independent risk factor but can also occur in combination with intrinsic and extrinsic risk factor such as bad lighting, balance problem, improper footwear.”
 - Källstrand-Ericson *et al.* (2009)
- “Vision makes an important contribution to balance, and impaired vision is a significant independent risk factor for falls and fractures in older people.”
 - Lord (2006)

Literature (cont')

- A reduction in the ability to detect weak contrasts, to distinguish between changes in surface, to judge distance, and to perceive the relationship between objects and persons in the environment, is associated with this type of fall.
 - Freeman et al (2007); Lord (2006)

Client rehabilitation goals

- Fear of falling may actually have an impact on autonomy, social interactions, the desire to travel, and participation in formal social activities
- This fear may contribute to increased isolation and leave room for doubts about one's real capabilities

Client rehabilitation goals (cont')

- Take a holistic approach toward the client
- Change life habits that affect the four groups of risk factors
 - Personal; environmental; behavioral; and socio-economic
- Participation in the fall prevention program enables the client to achieve his/her unique personal goal(s)
 - e.g., to improve balance and to reduce fear of falling

Client rehabilitation goals (cont')

- The client has the opportunity to learn and practice various rehabilitation tools or techniques
- For example:
 - Use communication strategies learned with the audiologist
 - Practice and review cane techniques in stairwell, pick an object off the ground, etc., learned with the O&M
 - Practice auditory ranging (with the O&M and audiologist)
 - Use the technique learned with the occupational therapist to get up from the ground

STAND UP™ program

- Created by local public health agency: Direction de la Santé Publique (DSP) Montréal-Centre
- Founded in 1995
 - Adapted in 2008 for blind clientele (INLB)
 - Adapted in 2009 for deaf-blind clientele (IRD-INLB)
- Two important disclaimers
 - Proprietary (©) to the local public health agency
 - Not to be offered without proper training

STAND UP program: objectives

- Improve balance and leg strength
- Develop the ability to make adjustments in the home and adopt safe behaviors
- Enhance a feeling of effectiveness related to fall prevention
- Help maintain bone density in sites that are most vulnerable to fracture
 - Wrists, hips, and backbone
- Encourage the practice of regular physical activity

Source: DSP Montréal-Centre (2002)

STAND UP program: scope

- Target audience
 - Autonomous seniors living in the community that are concerned about falling or are worried about their balance
- 12 weeks in all
- Three components:
 - Group exercise program (2x / week)
 - Home exercise program (1x / week)
 - Fall prevention information and discussion sessions

STAND UP program: exercise objectives

- Improve balance
- Increase leg strength
- Improve ankle mobility
- Stimulate lower limb proprioception
- Maintain bone density where there is risk of fracture (wrists, hips, backbone)
- Improve the ability to get up from the ground

Source: DSP Montréal-Centre (2002)

Clinical project with adapted STAND UP program

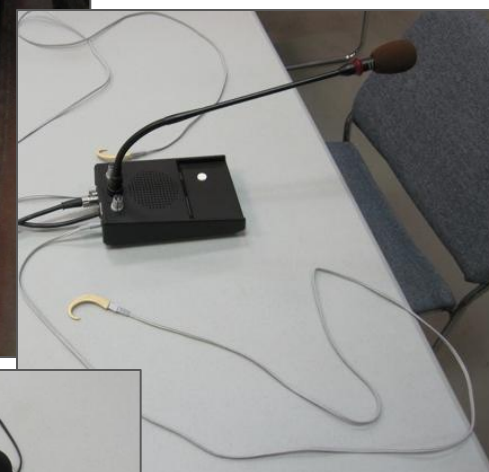
- Clinical projects
 - Spring 2009 session: 5 participants
 - Fall 2009 session: 13 participants
 - Including 8 new to the program
 - Spring 2010 session: 12 participants
 - Including 4 new to the program
- Total of 17 unique participants over the three sessions

Clinical project with adapted STAND UP program

	Age	Gender	Cochlear Implant	Hearing aid	Usher Syndrome	Total Blindness	Ocular pathology	Type	Mobility aid
1	63	W	X		X	X	Retinitis pigmentosa	Congenital	Guide-dog
2	62	W		X		X	Retinitis pigmentosa	Acquired	Support cane
3	65	W	X		X		Retinitis pigmentosa, cataract	Congenital	Guide-dog
4	54	W		X		X	Glaucoma	Congenital	Long cane
5	71	W		X			Chorioretinal scars	Congenital	Support cane
6	64	W		X			Retinitis pigmentosa	Acquired	Guide-dog
7	65	M	X			X	Phthisis eyeball	Congenital	Long cane
8	77	W		X			Macular degeneration, glaucoma	Acquired	None
9	55	W					Cataract	Congenital	Long cane
10	69	W		X			Retinitis pigmentosa, cataract	Acquired	Long cane
11	55	W		X		X	Retinitis pigmentosa	Acquired	Long cane
12	64	W		X	X	X	Retinitis pigmentosa	Congenital	Long cane
13	63	W	X		X		Retinitis pigmentosa	Congenital	Long cane
14	64	M	X			X	Phthisis of the ocular globe	Congenital	Long cane
15	63	M		X			Diabetic retinopathy	Acquired	Walker
16	87	W		X			Macular degeneration	Acquired	Support cane
17	72	M		X			Retinal detachment, cataract	Acquired	Walker
Total	65		5	12	4	7			

Program adaptations

- Written information
 - Braille, large print, e-mail
- Audio
 - Amplification system, personal frequency modulation system
- Environment
 - Familiarity with the immediate environment
 - Lighting, blur conditions
 - Placement of participants on the basis of residual vision or hearing
 - For safety purposes, all potential obstacles were removed



Program adaptations: teaching guidelines

- Slower pace in order to better understand instructions and body movements
- Simple and precise language and vocabulary
- Breakdown movements into component parts
- Repeated identical teaching sequences
- Coaction, hand over hand, or tactile modeling
- Counting repetitions out loud
- Group communications strategy
- Objectives tailored to each individual

Fall prevention information and discussion sessions

- Objectives:
 - Increase participants' feelings of effectiveness related to preventing falls
 - Develop participants' ability to identify hazards in their environment and behaviors that put them at risk
 - Motivate and facilitate actions that aim to reduce these risks

Source: DSP Montréal-Centre (2002)

Fall prevention information and discussion sessions

- Subjects such as adapting to the environment and modifying behaviors / habits
- Examples:
 - Keep your bones healthy from head to toe !
 - In your living room, **STAND UP** safely !
 - In your bedroom, get up on the right foot !
 - Find the shoe that fits
 - Make sure medication helps you stay on your feet
 - On the stairs and outdoors, keep a firm footing
 - Go all out to stay in shape

Source: DSP Montréal-Centre (2002)

Measuring progress (pre- and post-session tests)

- 1) Functional reach test
 - Measure of balance within the limits of stability
- 2) Tandem test
 - Check the participant's balance when his or her support base is reduced
 - (e.g., with eyes opened and closed)
- 3) One-legged test
 - This validated measurement indicates an elderly person's risk of falling and even his or her risk of fracture
- 4) Sit-to-stand test
 - Evaluate lower limb strength

Source: DSP Montréal-Centre (2002)

Measuring progress (pre- and post-session tests)

Pre- and post-session tests													
Participant	Functional reach (inches)			Tandem (seconds)			One-legged (seconds)			Sit-to-stand (seconds)			Average improvement
	Sept	Nov	% improvement	Sept	Nov	% improvement	Sept	Nov	% improvement	Sept	Nov	% improvement	
1	12	15	20	7	12.81	83	6	3	-	14	12	17	30
2	4	7	75	Unable	5.2	100	0	1	100	20	31	-	69
3	13	14	8	5	10	100	6	3	-	16	15	7	29
4	11	12.5	14	30	20.77	-	2	2	-	17	14	21	9
5	12	Abs.	-	5	Abs	-	2	Abs.	-	18	Abs.	-	-
6	11	Abs.	-	Abs.	Abs	-	1	Abs.	-	33	Abs.	-	-
7	8	13	63	6	32.56	100	2	1	-	25	19	32	49
8	8	13	63	Unable	7.78	100	3	5	67	22	18	22	63
9	13.5	11.5	-	6	9.44	57	20	8	-	24	23	4	15
10	10	Abs.	-	8	Abs	-	1	Abs.	-	24	Abs.	-	-
11	13	13	0	2	29.66	100	3	3	-	34	23	48	37
12	11	14	27	7	7.5	7	4	3	-	19	21	-	9
13	10.5	13.5	29	9	9.45	5	4	7	75	21	15	40	37

Clinical observations: positive outcomes

- The strength of the group and its importance in promoting motivation, perception of self-worth, and rich social interactions
- The importance of leaving time for informal exchanges
- The importance of having fun
- The importance of providing participants with material required for home exercises
- Participants respect their capacity, taking breaks if necessary

Clinical observations: positive outcomes

- Where there are losses of balance during exercises, we observe faster, more spontaneous and more efficient adjustments in posture
- Participants were less apt to use one or both hands on their chair for support
- Improvement in coordination and execution times when exercise guidelines are presented to and repeated by participants at the same time as the actual exercise

Clinical observations: positive outcomes

- Enabled an exchange of knowledge, tips and workarounds, and awareness of other health network resources
- Improvement in the detection of the position of their bodies in space
- Movements become more fluid during execution as participants adopted them and made them their own
- Participants learned to breathe better and to recognize signs of fatigue for their bodies and their concentration

Clinical observations: negative outcomes

- Difficult for participants to remember the complete series of home-based exercises
- Difficult for participants to find motivation for physical activities while at home and to make a positive lifestyle change
- Due to lack of resources, unable to offer the program 2 times a week as recommended by the STAND UP program

Participant feedback

- “I feel better about myself and I feel that my balance has improved”
- “I am less afraid of falling and the program has given me more confidence and balance during my outings; I am less nervous; I quite enjoy working together in a group”
- “I loved the program; it allowed me to meet other people; I feel that I have improved my balance, my confidence and I feel stronger”
- “I have improved a lot, and I am happy to have my program at home; I had forgotten about the rest of my body and now I know that my entire body is important”

Participant feedback (cont')

- “The group interactions were very enriching”
- “The opportunity to participate in the group forced me to get out, to take the subway and to begin exercising; I am in better physical condition; I appreciated the collaborative approach of the facilitators; I find it stimulating; we have so many reasons to want to participate”
- “I am sad that the program is coming to an end; I really appreciated the exercises and my balance has improved; I learned a lot from the counseling; I am proud of what I have accomplished”

Conclusions

- Participation in a multi-factor program for the prevention of falling appears to offer benefits in the short term
- Participants understand that there are a variety of risk factors that may contribute to falling and they have the ability to influence many of these factors
- Participants indicated improvements in their balance but also spoke of the difficulty of integrating the home-based program into their daily routine and of maintaining an active lifestyle
 - A lack of motivation as well as the need to receive regular feedback were identified as the main reasons; the program's interdisciplinary approach appeared to have some impact on participation rates

Conclusions

- “The O&M specialist may be involved in assessing parts of a home environment and providing advice on safe negotiation of environmental hazards, in and around the home.”
 - Couturier (2009)
- “In addition to the factors that contribute to falls within the older population, the O&M specialist needs to be fully aware of other issues pertaining to the older person living with a visual impairment.”
 - Couturier (2009)

Future efforts

- Expanded review of literature regarding falls and balance problems with the deaf-blind
- Work in collaboration with audiologists and researchers to better understand the impact of deaf-blindness and cochlear implants on falling and balance problems
- Offer the program to a clientele with Type 1 User syndrome
- Increase program frequency to 2 times a week
- Work with the community to develop additional physical activity offerings for the deaf-blind population

Acknowledgements

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For more information

- For more information about the STAND UP program, please visit:

www.santepub-mtl.qc.ca/programmechute/standup.html

More information

- For more information about program adaptations for the deaf-blind, please contact :
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