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ABSTRACT

These journal articles, which address the education of students with physical disabilities, include the following: (1) an interview with Jim Silcock, a Joan Wald Bacon Award Recipient for 2000; (2) Students with Orthopedic Impairments in the General Education Classroom: A Survey of Teacher Roles and Responsibilities (Alison M. Stafford and others); (3) Nondriving Challenges and Solutions for Adolescents: How To Find Wheels (L. Penny Rosenblum and Anne L. Corn); (4) Selective Dorsal Rhizotomy: What Educators and Related Service Providers Need To Know (S. John Obringer and Kenneth M. Coffey); (5) a book review of Physical, Sensory, and Health Disabilities: An Introduction (Frank G. Bowe); (6) a book review of The Educators Guide to Medical Issues in the Classroom (Frank M. Kline, Larry B. Silver, and Steven C. Russell); (7) Without a Leg To Stand On: The Unraveling of a Teaching Specialty in Special Education (Steven E. Daley); (8) Essential Elements of Effective Teamwork: Shared Understanding and Differences between Special Educators and Related Service Providers (Bonnie L. Utley and Mary Jane K. Rapport); (9) Review of Intrathecal Baclofen Therapy for Spastic and Rigidity Disorders (S. John Obringer and Kenneth M. Coffey); and (10) a book review of A Teachers Guide to Including Students with Disabilities in General Physical Education (Second Edition). (Most articles include references.) (CR)

Physical Disabilities: Education and Related Services, Fall 2001-Spring 2002.

Barbara J. Kulik, Editor

PHYSICAL DISABILITIES: EDUCATION AND RELATED SERVICES

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INVITED INTERVIEW

JIM SILCOCK
Joan Wald Bacon Award Recipient, 2000

Has life changed since you received the Joan Wald Baken Award?

We have added more children to our family!

You and your wife, Ann Belles, recently adopted your 16th child. How is he adjusting to life in the U.S.? How did you come to adopt him? How does he feel about having a big family?

Alin is doing very well. After spending his entire life in a Romanian orphanage it was pretty overwhelming to move to the United States. Alin has handled the change very well and has only had a few meltdowns. Alin is learning English quickly. He recently told me, "Daddy, Romania is yucky. No mommies. No daddies. No kisses!"

How did you and your wife meet?

We met on the Internet. I was living in Florida and she was in Southern California. We typed with each other in January 1998, by February we decided to get married, by April I was living in Southern California and in May 1998 we got married. This was the first marriage for both of us. When we first met, neither was looking for a relationship but it didn't take long for us to discover that we were soul mates.

How did you get started with parenting a large family? Where did the motivation come from?

Ann was a foster parent for many years. She wanted to provide a "forever family" for children who would otherwise have little chance for adoption. Now we are the proud parents of 16 boys. We often get calls from adoption workers asking us to consider children that are considered "unadoptable." Our family keeps growing because we believe that it is every child's right to have a secure and loving forever family.

What is it like to have a big family? What is a typical day like?

In order to get through our day we have to be very organized. Ann and I divide the duties up which limits miscommunication. We wake up with the kids in the morn-

ing and help them get through their morning routine. Some of the kids need total care, others need prompts to get through their morning, and a few are independent. After the kids go to school, Ann and I are involved with school meetings, doctor appointments, and managing our Supportive Living business. When the kids come home from school it is back to homework, chauffeuring to after school activities, and the nighttime routine. Once the kids are in bed, Ann and I get a few more hours of work completed before we go to bed.

What are the age ranges of your children? Are they all children with special needs? How did you determine which children to be parents for?

Our boys range in age from 2–23 years old. All of the children have special needs. Some of the children have developmental delays due to physical or mental disabilities; others are delayed due to early institutionalization. Some of the children have both developmental disabilities and mental health issues. Many of the children came from abusive backgrounds. Some of the disabilities that our kids have are cerebral palsy, Spina Bifida, muscular dystrophy, fetal alcohol syndrome, Tourette syndrome, Leigh's Disease, hydrocephalus, g-tubes, tracheotomy, hearing and vision impairments, head injury, quadriplegia, seizure disorders, OCD, RAD, conduct disorder. We always choose children that have waited a long time for a family. Children whose disabilities, ethnicity, and age have caused barriers to being matched with a family. All of our children are boys.

What are some challenges you and your wife face when parenting children with special needs?

One of the biggest challenges is working with the school system. Trying to get the educators to buy into the idea of inclusive education and helping them "look outside of the box." Our children often present a unique combination of challenges that overwhelm the school system. We spend a great deal of time "teaching the teachers."

How do you meet the needs of your children in areas such as coordinating therapy, homework, extracurricular activities, doctor visits, etc?

We have extra help each day. We have 14 "nannies" who work with us to ensure that all of our kids' needs are met. Often we have children going in five different directions plus others staying home. Even with four vans it can be a logistic challenge.

It's unique to have a large family today. Did you plan to foster and adopt as many children as you currently have?

Ann always wanted to adopt. I actually never thought about parenting until I met Ann. I don't believe either of us ever thought of parenting so many children!

Do you have any help with having a large family?

We have helpers throughout the day. The state also provides the children with medical insurance. Some of the kids receive nursing services.

What are your dreams and goals for your children?

We want our kids to have meaningful and real lives. We hope that they have opportunities to be contributing members of society and to have the necessary supports to live, work, and play safely and successfully in the community.

What are your dreams and goals with your wife?

We would like to help our kids grow up and instill a sense of responsibility in them. We would like to know that our children had everything they needed to be productive adults. We would also like to be a role model for other families who are thinking about adopting children with special needs.

What are the dreams and goals your children have?

The kids all have their own goals. Some of the kids look forward to learning how to walk better, or to read, or even to drive a car. Probably very typical dreams for children of their age.

What do you and your family like to do for fun?

Actually one of our common hobbies is acting. All of the boys and I are actors. Most of us have done movies, television shows, commercials, public service announcements, and print ads. Some of us are members of the Screen Actors Guild. Although Ann doesn't act, she is in charge of sending out headshots and resumes.

With a large family there must be lots of celebrations. What things do you do for birthdays, holidays, and special occasions?

We all get together, usually at the house, for birthday parties and other celebrations. We make a big deal about parties and always celebrate with gusto. Generally we have dinner together and then do the cake and presents. Parties are always a huge event at the house.

Are you able to go on family vacations? Would you please share a fun experience with us?

We have taken the kids to San Francisco, Las Vegas, Hawaii Disney World in Florida, and a Mexican cruise. As you can imagine it is quite an adventure with all of the kids, all of their medical equipment, all of our helpers, and us! We can be quite a motley crew.

What do you and your wife like to do when you have some free time?

We like to take little vacations (2–3 days) together. We enjoy going to plays, movies, and concerts. We also enjoy eating out and going to church.

Do you have future plans on adopting or fostering more children? Are all of your children adopted, fostered, or both? Is there a difference in your parenting?

We will continue to adopt, as we feel called to do so. Currently we have 16 adopted children and two foster children. Our parenting style is the same. Other than the last names of our foster children, there is no difference. We are committed to parenting all of our children with love and logic.

Interview conducted by
JENNIFER J. PARK
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STUDENTS WITH ORTHOPEDIC IMPAIRMENTS IN THE GENERAL EDUCATION CLASSROOM: A SURVEY OF TEACHER ROLES AND RESPONSIBILITIES

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ABSTRACT

With the increased effort to educate students with orthopedic impairments in general education settings, it becomes more important that general education teachers possess the skills necessary to provide adequate educational services to these students. Twenty-eight skills were identified as being necessary for service providers to have in order to provide adequate educational services to students with orthopedic impairments. A survey was developed that asked both special and general educators who were currently working with students with orthopedic impairments to indicate their level of agreement as to whether these skills were important for general educators to know when working with this population. In addition, the survey asked respondents to indicate their self-perceived level of competence for each skill; indicate where, if anywhere, they learned the skill; and who is currently responsible for performing the skill in their setting. Results of the survey indicate general agreement between special and general educators with regard to the skills general educators should have when working with students with orthopedic impairments. As would be expected, special educators rated their level of competence

higher than general educators, although general educators indicated average or above skill level in some significant areas. Both special and general education respondents agreed that special educators were responsible for performing the skills. However, on all but three of the items, general educators indicated they were responsible at a higher rate than indicated by special educators.

The primary goal of education, be it general or special education, is to prepare students to function in the adult world. This requires proficiency in cognitive, social, emotional, vocational, communication, and physical domains. Education has traditionally focused on the intellectual abilities of students; however, sensory and motor components are also essential for gaining skills. Deficits in sensorimotor and physical abilities in particular can limit achievement in any or all of these domains (P. H. Campbell, 1987; S. K. Campbell, 1991) resulting in varying degrees of dependence on family and society.

Students with orthopedic impairments have a range of conditions that can interfere with sensorimotor and physical development. Some of these conditions include cerebral palsy, spina bifida, and muscular dystrophy. These conditions often result in abnormal muscle tone, decreased range of motion, decreased strength, poor balance, abnormal sensory processing, and/or generally delayed development (Bowe, 2000; Heller, Forney, Alberto, Schwartzman, & Goeckel, 2000). In order to achieve an appropriate education, these students will require adaptations and modifications to the academic aspects of their educational program, as well as other areas such as adaptive materials and equipment, assistive technology, handling and positioning, physical management, environmental arrangement, emergency procedures, and accommodations for fatigue and medical conditions (CEC, 1998). Students with orthopedic impairments who do not receive considerations in these areas may not adequately benefit from educational services and may fail to reach their potential. Also, a lack of knowledge on the part of the teacher in these areas may, in extreme cases, endanger students' lives (Heller, 1997).

Over the years, legislation and medical advances have resulted in a growing number of students with orthopedic impairments being served in increasingly integrated settings (Ammer, Best and Kulik, 1994; Best, Ollie, Weinroth, Dykes, & Heller, 1998). As parents and educators are placing more emphasis on the mandate of Least Restrictive Environment, students with orthopedic impairments are moving into the general education environment. This movement toward more integrated placements has resulted in an increasing number of professionals finding themselves responsible for

meeting the educational and physical needs of these students. Research into the attitudes of general education teachers has found that many teachers would be more agreeable to integrating these students into the mainstream if they possessed the necessary skills and knowledge to appropriately plan and implement necessary adaptations and modifications. These teachers reported that they were uncomfortable with the prospect of including these students due to a lack of training with regard to the students' unique needs (Frith & Edwards, 1981; Goodman & Yasumura, 1992; Nader, 1984; Parette & Hourcade, 1986; Phillips, Allred, Brulle, & Shank, 1990). For students with disabilities, these deficits in teacher preparation can have serious detrimental effects on their educational outcomes and physical well-being.

General education teacher preparation programs focus on how to remediate learning deficits; they do not typically prepare teachers for practical physical management of students with orthopedic impairments, nor provide a foundation from which to work with the special education teacher in this area. "Physical management is recognized as the foundation upon which to build effective educational experiences and an improved quality of life for persons with multiple handicaps" (Fraser, Hensinger, & Phelps, 1990, p. 11). This is critical for individuals with severe orthopedic impairments regardless of the presence of an intellectual disability.

Students with orthopedic impairments are one of the fastest growing populations of students receiving special education services (Knight & Wadsworth, 1993). They are also a population that is now frequently included in the general education classroom (Ammer, Best, & Kulik, 1994). One of the consequences of the increased number of students with orthopedic impairments placed in the general education classroom is that many general education teachers are working with students with physical disabilities for the first time. As noted by Goodman and Yasumura (1992), "unfortunately this trend in programming is not reflected in teacher training programs" (p. 345). In addition, Cross, Collins, and Boam-Wood (1996) reported the majority of teachers and therapists experienced informal to no training in interdisciplinary collaboration.

"Independence, normalcy and acceptance can be the positive outcome" (Knight & Wadsworth, 1993, p. 215) of including these students in the general classroom effectively. However, questions remain regarding how well this is occurring. The intent of this study is to determine: 1) which skills general educators should possess to work with students with orthopedic impairments in the opinion of both general and special educators; 2) the perceived level of competence by both special and general educators of these skills; 3) who

is currently performing these skills; and 4) where training of these skills took place.

METHOD

QUESTIONNAIRE

A survey instrument containing items regarding skills determined to be necessary to meet the educational needs of students with orthopedic impairments was developed based on CEC competencies for teachers of students with physical and health impairments and current literature (CEC, 1998). The initial draft was sent to professors of special education, special education teachers not included in the sample, and school-based physical therapists for input on content validity, terminology, and accuracy. After revision, the survey was field tested with graduate students enrolled in classes in special education. This group completed the survey and provided feedback on format and clarity prior to distribution to the targeted population.

The survey contained 28 items identified as skills necessary to appropriately serve students with orthopedic impairments in educational settings. The items were grouped into six areas: physical management, adaptive equipment, emergency/healthcare issues, classroom adaptations, assistive technology, and collaboration. Four questions were asked about each item.

The first question asked the respondents to determine the skills important for general education teachers to have according to general and special educators. Respondents of the survey were asked to indicate their level of agreement with the 28 items: "It is important that general education teachers working with students with orthopedic impairments have the following skills." A Lickert-type scale provided the response options of strongly disagree, disagree, neutral, agree, and strongly agree. For reporting purposes, responses were grouped with strongly disagree and disagree collapsed to "disagree," and agree and strongly agree collapsed to "agree."

The second question asked the respondents for the self-perceived level of competence for both general and special educators of all 28 items. Respondents were instructed, "As a teacher working with students with orthopedic impairments, rate your current level of competence on the following skills." Response options were: none, below average, average, above average, and high. For reporting purposes, the responses average, above average, and high were collapsed and are reported as "average or above." This was done because it was felt that if a teacher's skill level was at least average, they

were capable of providing students with adequate services. The responses of below average and none were also collapsed and are reported as "below average or none," because it was believed that any level of skill below average was not adequate to provide students with adequate services.

The third question asked respondents where they acquired the skill. Response options included undergraduate school, graduate school, inservice training, on-the-job, and NA. Teachers were asked to indicate "NA" here if they had responded "none" to the same item on the previous question.

The fourth question asked respondents, "In your setting, who is responsible for performing this skill?" Response options included therapist, general education teacher, special education teacher, paraprofessional, nurse, parent, and other. When responding to this component, teachers were instructed to "circle all that apply."

Participants

Ninety-five teachers of students with orthopedic impairments (OI teachers) were identified through Georgia Learning Resources System Centers and local special education directors. Each of these teachers was sent a package containing two survey packets and a letter of introduction. The letter asked the OI teacher to complete one survey and distribute the second packet to a general education teacher who was currently serving a student with orthopedic impairments. The surveys and instructions for completion and return were identical.

Teachers certified in orthopedic impairments serve children whose orthopedic impairment interferes with their educational performance. In Georgia, students with orthopedic impairments may have mild intellectual disabilities, normal intelligence, or be gifted in order to qualify for services of a teacher certified in orthopedic impairments (Georgia State Board of Education, 2000). Students with more severe intellectual disabilities along with their orthopedic impairments receive services from teachers certified in mental retardation. These teachers were not included in the survey.

Data Analysis

Data from the questionnaire were entered into Version 6 of Epi Info. Epi Info is a series of microcomputer programs designed for organizing questionnaire data that can then be used with several different statistical programs. For this survey, frequency count and percentages were obtained from Epi Info. Random double entry verification was used to ensure accuracy.

RESULTS

Survey packets were sent to 95 teachers of students with orthopedic impairments (OI teachers). Since each of these packets included a second survey to be given to a general education teacher working with student(s) with orthopedic impairments, 190 surveys were distributed. One packet was returned by the postal service as being undeliverable, leaving 188 surveys, of which 80 were returned, yielding a return rate of 42.6%. Six of these were incomplete and were not included in the final analysis. Assessing the return rate per teacher certification area, 51.1% of the OI teachers and 27.7% of the general education teachers returned the survey. As all of the OI teachers may not have distributed the second survey packet as requested, there is no accurate count of how many general education teachers actually received the survey.

The teachers who returned the surveys represented all educational levels. Of the 48 OI teachers, 19 (39.6%) were certified at the bachelor's level, 26 (54.6%) at the master's level, 2 (4.2%) at the specialist level, and 1 (2.1%) at the doctorate level. General education teachers included 12 (46.2%) who were certified at the bachelor's level, 11 (42.3%) at the master's level, and 3 (11.5%) at the specialist level.

Important Skills for General Education Teachers

The first part of the questionnaire asked teachers to indicate their agreement with the statement "it is important that general education teachers working with students with orthopedic impairments have the following skills" with regard to each of the 28 skills. Table 1 lists the agreement rates for special and general education teachers.

Items in which there was a greater than 20% difference in agreement rate between the two groups were number 7, incorporate positioning in daily routines; 8, position students in adaptive equipment; 21, implement computer adaptations; and 26, collaborate with other professionals. For all four of these items, the general education teachers agreed at a higher rate that these skills were important than did the special education teachers.

Skill Competence for Special and General Educators

The second part of the questionnaire asked teachers to rate their current level of competence on each of the 28 skill items. All of the special and general education teachers rated themselves as average or above for items 1, understand normal growth and development; 17, demonstrate flexibility and willingness to make modifications in methods of assignment completion; and 28, develop and maintain open communication with family to include the

TABLE 1.
Percent of respondents who agree it is important for general education teachers to have certain skills and self-perception of having these skills.

	% agree skill is important for general educator to know		% rated skill competence as below average or none	
PHYSICAL MANAGEMENT	Special Educators	General Educators	Special Educators	General Educators
1. Understand normal growth and development.	96.0	88.0	0.0	0.0
2. Recognize and adapt for abnormal postures and reflexes.	50.0	69.2	8.3	48.0
3. Recognize and reinforce normal postures and reflexes.	61.2	76.9	8.3	42.3
4. Implement appropriate methods of lifting students.	64.6	50.0	2.1	53.8
5. Appropriately position students in standard classroom equipment.	64.6	73.1	6.3	34.6
6. Correctly implement appropriate relaxation techniques.	31.3	46.2	16.7	61.5
7. Incorporate the positioning/repositioning needs of the student into daily routines.	51.1	73.1	8.3	38.5
ADAPTIVE EQUIPMENT				
8. Appropriately position students in adaptive equipment.	8.7	34.6	6.3	76.9
9. Perform basic maintenance of adaptive equipment.	6.5	26.9	14.6	69.2
10. Adapt/modify specialized equipment.	30.4	53.8	4.2	38.5
11. Monitor prosthetics and orthotics for proper fit and function.	4.3	26.9	29.1	84.6

TABLE 1.
Continued

	% agree skill is important for general educator to know		% rated skill competence as below average or none	
EMERGENCY/HEALTHCARE	Special Educators	General Educators	Special Educators	General Educators
12. Perform cardiopulmonary resuscitation.	79.2	73.1	22.9	30.8
13. Perform noninvasive healthcare procedures.	4.2	16.2	22.9	84.6
14. Understand the importance of medication administration and precautions.	62.5	53.8	8.5	34.6
15. Demonstrate knowledge of specific medical conditions of students.	87.5	88.5	6.4	23.1
MODIFICATIONS AND ADAPTATIONS				
16. Make appropriate adaptations to classroom materials.	85.4	92.3	4.2	11.5
17. Demonstrate flexibility/willingness to modify methods of assignment completion.	91.7	100.0	0.0	0.0
18. Adapt/modify standard classroom equipment.	75.0	88.5	2.1	11.5
19. Provide adequate room for adaptive equipment.	66.7	80.8	6.7	15.4
20. Ensure complete accessibility to school environment for students using wheelchairs, walkers, etc.	87.2	84.0	2.1	8.3

TABLE 1.
Continued

	% agree skill is important for general educator to know		% rated skill competence as below average or none	
ASSISTIVE TECHNOLOGY	Special Educators	General Educators	Special Educators	General Educators
21. Implement adaptations to a computer to provide access.	45.8	76.0	20.8	48.0
22. Implement a variety of low technology devices to assist with student functioning and access to activities.	47.9	61.5	10.4	70.8
23. Implement electronic communication devices.	47.9	61.5	20.8	73.0
24. Implement non-electronic communication devices.	57.4	68.0	12.5	60.0
COLLABORATION				
25. Act as team facilitator to ensure student receives appropriate educational services.	68.8	76.9	2.1	19.2
26. Collaborate with other professionals.	62.5	88.5	2.1	11.5
27. Know when it is appropriate to request assistance of related service personnel.	76.0	81.0	6.3	11.5
28. Develop and maintain open communication with family to include the exchange of information and collaboration with regard to educational programming.	83.3	96.2	0.0	0.0

exchange of information and collaboration with regard to educational programming.

As seen in Table 1, 29.2% of special education teachers rated their competence level as below average or none for items 11, monitor prosthetics and orthotics for proper fit and function; and 23, implement electronic communication devices. In response to items 12 and 13, perform cardiopulmonary resuscitation and noninvasive medical procedures, 22.9% of special education teachers rated their level of competence as below average or none. For item 21, implement adaptations to a computer to provide access, 20.8% of special educators indicated their current level of competence was below average or none.

A majority of general education teachers (53.8% to 84.6%) indicated their competence level was below average or none for nine of the items (see Table 1). Competence levels of below average or none were also reported by 33.3% to 48% of general education teachers for an additional nine items (see Table 1).

Location of Skill Acquisition

Item 1, understand normal growth and development, was the only item which respondents indicated learning in undergraduate school (78.8% of all respondents). Both special (77.1%) and general (52.0%) education teachers indicated they learned item 12, perform cardiopulmonary resuscitation, during inservice training. A majority of special and/or general education teachers indicated that on-the-job training was the source of their instruction for 17 of the remaining items (see Table 2).

Responsibility of Skill Performance

The final question asked respondents to indicate who is currently responsible for performing each of these skills in their settings. Because item 1, understand normal growth and development, is a knowledge-based and not a performance-based skill, respondents were not asked to respond to the item in this section of the survey. For the other items, multiple responses were requested and received, indicating all of the individuals within a particular situation who are responsible. For all but four of the items, 82.2% or more of respondents indicated that the special education teacher in their setting is responsible for performing the skill. The exceptions were item 6, implement appropriate relaxation techniques; 11, monitor prosthetics and orthotics for proper fit and function; item 12, perform cardiopulmonary resuscitation; and item 13, perform noninvasive healthcare procedures. The percent of respondents for these items ranged from 67.1 to 77.8.

TABLE 2.
Percent of respondents indicating location of skill acquisition.

	Undergraduate		Graduate		Inservice		On-the-Job		NA	
PHYSICAL MANAGEMENT	Special	General	Spe	Gen	Spe	Gen	Spe	Gen	Spe	Gen
1. Understand normal growth and development.	84.8	68.0	10.9	8.0	0.0	8.0	4.3	8.0	0.0	8.0
2. Recognize/adapt for abnormal postures and reflexes.	22.9	16.0	35.4	4.0	4.2	8.0	37.5	28.0	0.0	44.0
3. Recognize/reinforce normal postures and reflexes.	20.8	12.0	37.5	4.0	2.1	16.0	39.6	24.0	0.0	44.0
4. Implement appropriate methods of lifting students.	20.8	8.0	33.3	0.0	12.5	12.0	31.3	44.0	2.1	36.0
5. Appropriately position students in standard classroom equipment.	20.8	4.0	25.0	4.0	12.5	16.0	39.6	48.0	2.1	14.6
6. Correctly implement appropriate relaxation techniques.	8.3	8.0	31.3	0.0	8.3	4.0	41.7	24.0	10.4	64.0
7. Incorporate positioning needs into daily routines.	18.7	4.0	20.8	0.0	6.3	16.0	52.1	48.0	2.1	32.0
ADAPTIVE EQUIPMENT										
8. Appropriately position students in adaptive equipment.	16.7	4.0	22.9	0.0	6.3	4.0	50.0	28.0	4.2	64.0
9. Perform basic maintenance of adaptive equipment.	12.5	4.0	10.4	4.0	4.2	4.0	66.7	40.0	6.3	48.0
10. Adapt/modify specialized equipment.	10.4	4.0	12.5	4.0	8.3	12.0	60.4	48.0	8.3	32.0
11. Monitor prosthetics/orthotics.	8.3	8.0	20.8	0.0	0.0	4.0	54.2	12.0	16.7	76.0

TABLE 2.
Continued.

	Undergraduate		Graduate		Inservice		On-the-Job		NA	
EMERGENCY/HEALTHCARE	Special	General	Spe	Gen	Spe	Gen	Spe	Gen	Spe	Gen
12. Perform cardiopulmonary resuscitation.	8.3	16.0	4.2	0.0	77.1	52.0	2.1	0.0	8.3	32.0
13. Perform noninvasive healthcare procedures.	8.3	8.0	20.8	0.0	16.7	8.0	37.5	0.0	16.7	84.0
14. Understand importance of medication administration.	17.8	12.0	26.7	4.0	13.3	24.0	56.0	56.0	2.0	4.0
15. Knowledge of medical conditions of specific students.	18.8	12.0	31.2	0.0	0.0	8.0	43.8	76.0	6.2	4.0
MODIFICATIONS AND ADAPTATIONS										
16. Make appropriate adaptations to classroom materials.	29.2	32.0	39.6	0.0	0.0	8.0	31.2	52.0	0.0	8.0
17. Demonstrate flexibility/willingness to modify methods of assignment completion.	27.7	24.0	21.3	0.0	2.1	4.0	46.8	68.0	2.1	4.0
18. Adapt/modify standard classroom equipment.	14.6	16.0	22.9	4.0	6.2	4.0	56.2	68.0	0.0	8.0
19. Provide adequate room for adaptive equipment.	6.2	8.0	14.6	0.0	2.1	4.0	68.7	72.0	8.3	12.0
20. Ensure complete accessibility to school environments.	17.0	16.0	10.6	0.0	6.4	4.0	63.8	68.0	2.1	4.0

TABLE 2.
Continued.

ASSISTIVE TECHNOLOGY	Undergraduate		Graduate		Inservice		On-the-Job		NA	
	Special	General	Spe	Gen	Spe	Gen	Spe	Gen	Spe	Gen
21. Implement adaptations to a computer to provide access.	62.5	8.0	25.0	4.0	39.6	4.0	25.0	48.0	4.2	36.0
22. Implement variety of low-tech devices.	8.3	8.0	31.2	4.0	33.3	4.0	27.1	44.0	2.1	4.0
23. Implement electronic communication devices.	8.3	4.0	25.0	4.0	41.7	8.0	16.7	16.0	8.3	68.0
24. Implement non-electronic communication devices.	16.7	8.3	29.2	4.2	27.1	0.0	25.0	54.2	2.1	33.3
COLLABORATION										
25. Act as team facilitator.	29.8	8.3	23.4	0.0	8.5	12.5	34.0	54.2	4.3	25.0
26. Collaborate with other professionals.	21.3	16.7	23.4	0.0	8.5	12.5	42.5	54.2	4.3	16.7
27. Know when to request assistance from related-service personnel.	14.6	16.0	12.5	4.0	4.2	0.0	47.9	72.0	0.0	8.0

A majority of respondents, ranging from 50.7% to 69.9%, indicated that general education teachers are currently responsible for performing three of the skills: item 16, make appropriate adaptations to classroom materials; item 17, demonstrate flexibility and willingness to make modifications in methods of assignment completion; and item 28, develop and maintain open communication with family to include the exchange of information and collaboration with regard to educational programming. (See Table 3)

Several items were also seen as the responsibility of school personnel other than teachers. Five items were reported by a majority of respondents to be currently the responsibility of paraprofessionals. Four of these items dealt with appropriate methods of lifting and positioning, the fifth was responsibility for knowledge of specific medical conditions. The percent of respondents indicating this ranged from 52.1% to 69.9%. The specific items can be found in Table 3.

Therapists were reported by the majority of respondents as being responsible for all of the items regarding physical management and adaptive equipment (54.8–79.5%). In addition, a majority of respondents, 57.5% and 54.2%, indicated that items 18, adapt/modify standard classroom equipment; and 28, develop and maintain open communication with family; are the responsibility of therapists. Half or more of the respondents, 50% and 51.4, indicted that the school nurse is currently responsible for performing items 12, perform CPR; and item 13, perform noninvasive medical procedures.

Data were also examined regarding how general versus special education teachers reported the responsibilities of general education teachers. For 24 of the skills, general education teachers reported they were currently responsible for performing the skill at a higher rate than special educators indicated. The difference in response rate for these items ranged from 1.4% to 56.8%. For the remaining three items in this section of the survey, two, 11, monitor prosthetics an orthotics, and 13, perform noninvasive healthcare procedures, were reported by both special and general educators as being the responsibility of general educators at a rate of 0%. A list of these items and the response rates can be found in Table 3.

DISCUSSION

The majority of general education teachers agreed that it was important that they have specific skills necessary to teach students with orthopedic impairments. In the survey, over 50% of the general education teachers agreed that it was important for them to know 23 of the 28 skills. For all but four items, the agreement rates for both special and general educators were within 20

TABLE 3.
Percent of respondents indicating staff responsibility for skill performance.

PHYSICAL MANAGEMENT	Responsibility as reported by all respondents: Special Educator	General Educator	Para-professional	Therapist	Nurse	Responsibility of *General Educators* as reported by: Special Educators	General Educators
1. Understand normal growth and development.	NA	NA	NA	NA	NA	NA	NA
2. Recognize/adapt for abnormal postures and reflexes.	89.0	8.2	49.3	76.7	15.1	2.1	20.0
3. Recognize/reinforce normal postures and reflexes.	89.0	9.6	46.6	79.5	9.6	0.0	28.0
4. Implement appropriate methods of lifting students.	93.2	17.8	69.9	71.2	16.4	12.5	28.0
5. Appropriately position students in standard classroom equipment.	84.9	24.7	53.4	54.8	4.1	8.3	56.0
6. Correctly implement appropriate relaxation techniques.	69.9	5.5	32.9	72.6	8.2	0.0	16.0
7. Incorporate positioning needs into daily routines.	86.3	28.8	64.4	58.9	8.2	14.5	56.0

TABLE 3.
Continued.

	Responsibility as reported by all respondents:					Responsibility of *General Educators* as reported by:	
	Special Educator	General Educator	Para-professional	Therapist	Nurse	Special Educators	General Educators
ADAPTIVE EQUIPMENT							
8. Appropriately position students in adaptive equipment.	91.8	6.8	56.2	69.9	5.5	2.1	16.0
9. Perform basic maintenance of adaptive equipment.	84.9	4.1	39.7	68.5	6.8	0	12.0
10. Adapt/modify specialized equipment.	82.2	16.4	38.4	76.7	6.8	6.2	36.0
11. Monitor prosthetics/orthotics.	67.1	0.0	23.3	79.5	13.7	0.0	0.0
EMERGENCY/HEALTH CARE							
12. Perform cardiopulmonary resuscitation.	77.8	30.6	47.2	40.3	50.0	27.6	36.0
13. Perform noninvasive healthcare procedures.	73.6	0.0	48.6	13.9	51.4	0.0	0.0

TABLE 3.
Continued.

	Responsibility as reported by all respondents:					Responsibility of *General Educators* as reported by:	
	Special Educator	General Educator	Para-professional	Therapist	Nurse	Special Educators	General Educators
14. Understand importance of medication administration.	87.7	32.9	42.5	24.7	46.6	22.9	56.0
15. Knowledge of medical conditions of specific students.	93.2	49.3	52.1	41.1	45.2	39.6	68.0
MODIFICATIONS AND ADAPTATIONS							
16. Make appropriate adaptations to classroom materials.	90.4	50.7	28.8	42.5	1.4	31.2	88.0
17. Demonstrate flexibility/willingness to modify methods of assignment completion.	84.9	69.9	26.0	21.9	1.4	58.3	92.0
18. Adapt/modify standard classroom equipment.	89.0	37.0	31.5	57.5	4.1	18.7	72.0

TABLE 3.
Continued.

	Responsibility as reported by all respondents:					Responsibility of General Educators as reported by:	
	Special Educator	General Educator	Para-professional	Therapist	Nurse	Special Educators	General Educators
19. Provide adequate room for adaptive equipment.	82.2	42.5	13.7	27.4	0.0	27.1	72.0
20. Ensure complete accessibility to school environments.	86.3	46.6	27.4	39.7	4.0	35.4	68.0
ASSISTIVE TECHNOLOGY							
21. Implement adaptations to a computer to provide access.	90.4	16.4	28.8	37.0	0.0	14.6	20.0
22. Implement variety of low-tech devices.	87.7	15.1	31.5	42.5	2.7	14.6	16.0
23. Implement electronic communication devices.	83.3	11.1	25.0	41.7	1.4	14.6	4.2
24. Implement non-electronic communication devices.	91.7	18.1	33.3	40.3	1.4	14.6	25.0

TABLE 3.
Continued.

	Responsibility as reported by all respondents:					Responsibility of *General Educators* as reported by:	
	Special Educator	General Educator	Para-professional	Therapist	Nurse	Special Educators	General Educators
COLLABORATION							
25. Act as team facilitator.	95.8	43.1	22.2	36.1	8.3	37.5	54.2
26. Collaborate with other professionals.	94.4	41.7	23.6	45.8	16.7	29.2	66.7
27. Know when to request assistance from related-service personnel.	93.2	32.9	28.8	NA	2.7	22.9	52.0
28. Develop and maintain open communication with family.	98.6	63.9	26.4	54.2	22.2	52.1	87.5

percentage points This remarkable similarity suggests a willingness of general educators to expand their roles to meet the needs of these students in inclusive environments.

The area that general educators indicated was the least important was adaptive equipment, with the items of positioning students, performing basic maintenance, and monitoring prosthetics ranging from 26.9% to 34.6%. Most special education teachers also agreed that these skills were not necessary for general educators to have. Adapt/modify specialized equipment (item 10) was the only skill which most general educators agreed was important they have (53.8%) that most special educators did not agree was important for general educators to have (30.4%). Scoring these skills as unimportant for general educators may be due to their traditionally being the responsibility of a physical therapist, in conjunction with the special educator. Also, these skills are frequently performed in locations other than the general classroom (e.g., use and maintenance of adaptive equipment, monitoring orthotics for proper fit). For students who require limited special education services and spend their entire day in inclusive settings, the importance and responsibility of some of these items may increase for general educators.

Assistive technology was the primary area of disagreement between special and general educators. The majority of general educators indicated that it was important for them to have all the skills in this area (61.5% to 76.0%), even though the majority indicated they were not currently responsible for their performance. On the other hand, the majority of special educators indicated that three of the four items were not important for general educators to have. Since special educators indicated these were not important for general educators to have, it is not surprising that general educators reported they had below average or no skills with most of the items and had not effectively learned about them during on-the-job training.

With the reliance of students with orthopedic impairments on assistive technology for academic success, the need for teachers to be familiar with their assistive technology on some level is critical for a successful educational experience. This is especially true of the items in the survey dealing with computer access, electronic AAC devices, and low tech devices for accessing activities. Although there may be several reasons for the discrepancy, ranging from time constraints for general educators learning this area to difficulties with role release, the data indicating general educators believe it is important for them to have these skills in assistive technology point to an educational need. General educators should be provided the opportunity to learn these important skills in assistive technology which impact the education of students with orthopedic impairments. Formal training is needed in

this area for general educators, as well as opportunities for collaboration with special educators to explore the interests and needs of general educators and provide support and information.

Another category resulting in concern is that of emergency/healthcare. According to the Division for Physical and Health Disabilities (DPHD) position statement (1999), it is the responsibility of all teachers to maintain a safe, healthy environment for their students. This includes "learning about their students' specific physical and or health impairments, physical health care procedures, and treatment regime" as well as "CPR" (DPHD Critical Issues and Leadership Committee, 1999, p. 1). Teachers need to know the major problems and emergencies that could arise with each student, including what to look for should a problem occur due to a healthcare procedure. Although the majority of special and general educators (53.8%–88.5%) thought it was important for general educators to know most of these areas, these percentages are not satisfactory given that this area is critical for supporting the student's health. Equally of concern is that many respondents expressed the opinion that these areas were not their responsibility, and approximately a fourth of the respondents rated their skill level in most of these areas as below average. Ownership of maintaining a safe health environment needs to be taken on by all general and special educators.

The majority of general education teachers reported learning all the skills in the modification/adaptation area, all the skills in the collaboration area, and half of the skills in the emergency/health care through on-the-job training with average or above average skill level in these areas. This study makes it clear that general educators who are including students with OI in their general education classrooms may not be prepared when the student first crosses the classroom threshold. While in many cases planning and modifications for the student with OI may be viewed as the job of the special educator, not the general educator, the results indicate that general educators, for the most part, view these items as a necessary part of their skill/knowledge base if they are to work with students with OI. Also, if the general educator lacks skills in some of these areas, unsafe situations (e.g., lack of knowledge regarding medications or medical conditions) as well as ineffective learning environments (e.g., lack of knowledge regarding modifications) may be created. Providing general education teachers with knowledge regarding students with OI and their needs at the preservice level may help create a safer and more effective learning environment. The special educator can then teach the general education teachers more student-specific information.

Although the majority of respondents (67.1%–98.6%) indicated that special educators were responsible for performance of the skills included in

the survey, there was very little agreement between special and general educators on whether general educators were responsible for many of the skills. For 11 of the skills, the majority of general educators indicated they were responsible (52.0%–88.0%), while the majority of special educators did not agree (8.3%–39.6%). This occurred across all categories except adaptive equipment (which general educators did not rate as important) and assistive technology. It appears that most general educators feel assistive technology is an important area for them to have skills, even though they do not perceive themselves as currently responsible. This again supports the need for more information and training in this area for general educators.

The results of this survey indicate the need for further research in several areas pertaining to the training of general education teachers working with students with orthopedic impairments. What is the best method of providing this training? Preservice training programs rarely have the room to include additional coursework, regardless of the importance, when it realistically only reflects the needs of a small percent of the student population that a general education teacher may encounter. However, preservice general education training programs could be evaluated to determine the possibility of including some, if not all, of the skills covered in this survey within currently existing coursework. A second option for providing this training is through inservice training or staff development. This method would enable a group of teachers to receive training geared more to the needs of the students within their caseloads. This option provides opportunities for general and special educators, as well as related-service personnel, to come together to share expertise and to lay the groundwork for providing adequate educational opportunities for students with orthopedic impairments within their school system. Another option is on-the-job training in which a teacher receives one-on-one instruction, allowing the training to be geared very specifically to students' individual needs. This method is overtly problematic: What is the teacher to do until the relevant school personnel is available to provide the necessary training? How is the student to fare?

This third training option leads to more questions that need to be addressed. First, if teachers must rely on on-the-job training how is quality and appropriateness of the training going to be monitored? Who is conducting the training? What are the trainers' qualifications? Will there be follow-up to this training to monitor maintenance of skill? The second of these additional questions reverts to the overall question of the method of providing training. While training teachers in preservice or inservice models may be more efficient in the short run, are these models more efficient and effective in the long run? The individual needs and characteristics of students

with orthopedic impairments create a paradox. Would training with specific students be better for individual student needs and outcomes?

Student outcomes must be investigated. While the majority of respondents to the survey indicated the need for general educators to have a number of skills in order to work with students with orthopedic impairments, are they essential for the educational outcome of the students? Has this issue been investigated? Are there data to suggest that students with orthopedic impairments are not receiving adequate or appropriate educational opportunities due the lack of skill in their general education teachers?

The results of this study are limited by several factors. First, this survey was distributed only to teachers in Georgia. Further investigation is warranted to determine whether teachers in other states would provide similar information.

A second limitation rests in the lack of information regarding the number of general education teachers who actually received the survey. Because there are no records kept to indicate the names of general education teachers who serve students with orthopedic impairments, it was not possible to send the surveys directly to them. Instead, special educators were relied upon to distribute the surveys to colleagues.

Finally, the survey did not request that respondents indicate where they received their training. It is not known whether the special educators, who are certified in orthopedic impairments, received their training in undergraduate or graduate programs specializing in orthopedic impairments, or whether they completed additional coursework to add the orthopedic impairment certification to an existing certificate, either special or general education. It is also not known if any of these teachers was working on a provisional or probationary certificate.

In conclusion, this study identified which skills were viewed as important for general educators to have in the education of students with orthopedic impairments, as well as current competence of these skills and role responsibilities. Across the general categories of physical management, adaptive equipment, emergency/healthcare, modifications and adaptations, assistive technology, and collaboration, general educators and special educators typically agreed upon which items were important for general educators to know, although general educators indicated they were more responsible for many of the skills than special educators rated them as being. This was especially evident in the area of modifications and adaptations. Special education teachers may need to more clearly determine role responsibility as a part of the collaborative process and provide more support or information as needed to allow general education teachers to assume more responsibility when they are

willing to do so. This idea aligns with the inclusion philosophy that special and general education teachers should set up collaborative partnerships and special educators should assist and support general educators as they assume responsibility for students with disabilities as full members of their classrooms (Sailor, Gee, & Karasoff, 2000).

Of particular concern in this study were the areas of assistive technology and emergency/healthcare. General educators reported that knowledge of assistive technology was important, although most reported lacking skills in this area. Special educators, on the other hand, did not rate this area as important for general educators. Since the academic success of students with orthopedic impairments is often dependent upon assistive technology, special educators need to work collaboratively with general educators and provide the necessary knowledge and skills to general educators to support needed assistive technology in the classroom. In the area of emergency/healthcare, students' health and lives are often dependent upon the knowledge and skills of teachers in this area. Unacceptable knowledge, skill, and responsibility ratings pose significant threats to the safety of students with orthopedic impairments. Increased knowledge and skills and the recognition of this area as a responsibility for all school personnel is needed to create a safe, healthy environment for all students.

The successful education and integration of students with orthopedic impairments in general education classes can occur only through the acceptance, knowledge, and skills of their teachers. This study is promising in the overall agreement of general and special educators regarding the skills necessary for educating students with orthopedic impairments. However, further training is needed across such areas as assistive technology and emergency/healthcare. Only through acquisition of sufficient knowledge and skills, and the formation of collaborative partnerships among general and special education teachers (and other pertinent school personnel), will the needs of students with orthopedic impairments be met effectively.

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NONDRIVING CHALLENGES AND SOLUTIONS FOR ADOLESCENTS: HOW TO FIND WHEELS

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ABSTRACT

Adolescence is a challenging time for all young people including those who have disabilities. In countries such as the United States and Canada a rite of passage for today's teens is the driver's license. When a disability precludes obtainment of this milestone adolescents often feel that they are missing out on "obtaining independent wheels" so to speak. Finding Wheels: A curriculum for non-drivers with visual impairments for gaining control of transportation needs *(Corn & Rosenblum, 2000) is a tool to assist adolescents with visual and other disabilities in exploring their options as nondrivers. This ten unit curriculum is flexible in its design and can be used by teachers, orientation and mobility specialists, and families as they work with adolescents.*

In the 21st century in countries such as the United States and Canada the driver's license is equated with independence for the vast majority of teens and adults. Adolescents who have visual impairments and adolescents with other disabilities, such as physical and health impairments, may find themselves missing out on one of the rites of adolescence—driving. Driving is a cornerstone of our culture and is considered by many to be a rite of passage into adulthood. It is an integral part of the teen culture in the United States and Canada.

Often young people with disabilities do not realize that they have choices in how they maximize their independence as nondrivers in our very motor-vehicle-dependent society. Many adolescents with disabilities do not have role models who are nondrivers in their lives. Everyone they know drives—parents, older siblings, and peers. They rarely have an opportunity to meet individuals with disabilities who are successful at meeting their transportation needs as nondrivers.

Though our schools prepare our youth academically, they often fall short of preparing our young people to be successful in other aspects of their lives. In the field of visual impairment the Expanded Core Curriculum (Hatlen, 1996) was developed to address the unique need areas of students with visual impairments. These areas may be applicable to other disability groups as well. The unique areas of need for students with visual impairments are: compensatory academic skills including communication modes, social integration skills, recreation and leisure skills, use of assistive technology, orientation and mobility, independent living skills, career education, and visual efficiency skills (Hatlen, 1996). Kendall (1991) described similar educational needs for students with physical and other health impairments. Twenty needs were identified by Kendall (1991) including mobility, transportation, adaptive equipment, prevocational and vocational needs, and transition needs. *Finding Wheels* (Corn & Rosenblum, 2000) addresses many of the needs areas described for students with visual impairments (Hatlen, 1996) and students with physical and other health disabilities (Kendall, 1991).

Though *Finding Wheels* (Corn & Rosenblum, 2000) was designed for students with visual impairments, this curriculum is applicable to students with physical and health impairments as well. Some students with physical disabilities may be able to drive using standard equipment and some will benefit from hand controls and vehicle adaptations, such as vans equipped with lifts. Some students with physical disabilities will not be able to drive. For those who cannot drive, some of their needs mirror those of adolescents with visual disabilities. These include but are not limited to: 1) hiring drivers, taking taxis, requesting rides, and budgeting for transportation, 2) coping with frustrations associated with nondriving (e.g., late rides, scheduling rides, listening to peers as they talk about "driving"); and 3) making lifestyle and employment decisions based on how they will get to places of employment, where they will live, and how they will get errands accomplished such as buying groceries. Like students with low vision, students who are mildly physically impaired or health impaired may be able to ride a bike or walk, but may lack the motor control to drive. These young people are challenged as they work to understand how their disability impacts driving. In *Finding Wheels*

(Corn & Rosenblum, 2000) there is a unit for students to explore low vision driving using bioptic telescopic systems. Students with physical disabilities may benefit from exploring alternative options such as hand controls that may allow them to drive.

Students with physical disabilities will also have some unique areas that may differ from those of students with visual disabilities. For example, a student who uses a wheelchair or one who needs assistance in transferring will need to alert a driver to these needs. Also, when students with physical disabilities are planning transportation, they may need to consider such issues as dealing with bathrooms on long distance trips or in what ways a hired driver may have additional responsibilities during transit, such as assistance with food in a restaurant. Another concern is communication for students who have cerebral palsy or other physical disabilities that may have concomitant expressive language problems. Providing youth with physical and health disabilities opportunities to examine issues such as these and to plan for how they will maximize their independence during travel is necessary for future success.

Though *Finding Wheels* (Corn & Rosenblum, 2000) does not address vocational skills, it is well documented (Wolffe, 1999) that 70% of adults with visual impairments are unemployed or underemployed. A reason for unemployment or underemployment often reported by those who are unemployed or underemployed is transportation (Crudden & McBroom, 1999; O'Day, 1999). Many individuals with visual impairment and physical disabilities leave the secondary school experience unprepared to seek out transportation alternatives to meet their daily needs and vocational aspirations. Jamieson and Peterson (1995) report that students with physical disabilities in high school often face transportation barriers that must be addressed as part of a vocational preparation program. These authors describe the "Threshold" program that contains 12 lessons, one of which encourages students with physical and other health disabilities to explore barriers they face in regards to employment. If mobility and transportation barriers are not addressed during the high school years, students with physical disabilities may have great difficulty in locating and maintaining employment. Huss (1995) reviewed the records of 107 people who had low vision, were under the age of 40, and who had completed a high school education. These individuals had undergone driver's education for people with low vision. Prior to training only 39% were employed; however in the follow-up study, 94% were employed. These results make a powerful statement about the importance of access to transportation in relation to employment.

Finding Wheels (Corn & Rosenblum, 2000) was born out of the authors' experiences as nondrivers and a previous study by Corn and Sacks (1994) in which the impact of nondriving was explored with the working age population of adults with visual impairments. Corn is a low vision driver who uses a bioptic telescopic system for driving. The glasses she wears are specially designed to include a high power miniature telescope that enables her to view objects such as signs and traffic lights at a distance. Rosenblum uses a combination of walking, biking, public transit, paid drivers, taxis, and exchanging rides to meet her transportation needs. They have worked with school age children with disabilities including visual impairment and with university students some of whom are disabled. They found that the vast majority of teens and young adults with disabilities are not adequately prepared to be nondrivers in today's society and have had various aspects of their lives restricted as a result of poor preparation. Though the focus of their work is primarily on individuals with visual impairment, the curriculum they have developed is very applicable to other disability groups, especially students with physical and health impairments.

Finding Wheels (Corn & Rosenblum, 2000) is designed for adolescents in middle school and high school It is very flexible in how it is used by parents or teachers either at home, in school, or in a summer program. A teen can move through the curriculum individually or in a group. Not every teen will need to explore all ten of the units. Each individual's needs and interests will determine what parts of the curriculum are appropriate.

CURRICULUM DEVELOPMENT AND FIELD TESTING

The first draft of the curriculum was shown to blind and low vision adults and to an orientation and mobility instructor. Their recommendations and comments regarding omissions or additions were incorporated into the next draft. During the spring of 1999 *Finding Wheels* (Corn & Rosenblum, 2000) was field tested in five schools for the blind (Arizona, California, Indiana, Tennessee, and Texas), by five teachers of students with visual impairments (California, Oklahoma, Tennessee, Texas, and Virginia) and by two parents (California and New Mexico). Copies of the curriculum along with feedback forms were provided to each individual/school. No two individuals or groups used the curriculum in the same way, so some students were only given one or two exposures to it while others moved through several units. Since confidentiality was an issue during the field testing there was little information about the students themselves who were using the curriculum. It is not

known if some of the students had physical or health impairments in addition to their vision loss.

After four months one of the curriculum's authors communicated with the field testers to gather information about their experiences with the curriculum. Questionnaires were also sent to some teens and families of students who had used the curriculum, though few were returned. The phone conversations with field testers coupled with the written feedback forms and questionnaires from students and families assisted the authors in the fine tuning of the curriculum prior to publication. Though the field testing was not set up to be an experimental design, its intent was realized as to how usable the curriculum would be for a wide variety of audiences.

No two schools/individuals used the curriculum in the same way. The two parents each scheduled time to work with their sons on the curriculum when time permitted. Groups of students moved through the curriculum on a weekly basis in California in an after school meeting started by the teacher of the visually impaired with support from the orientation and mobility specialist. Some teachers (e.g., one in Virginia, one in Tennessee) met with students individually to use *Finding Wheels* (Corn & Rosenblum, 2000). The flexibility to schedule use of the curriculum with students individually or in a group was one of the reported strengths of this curriculum. Another strength reported by users was the flexibility to go in any order as one moves through the ten units.

The field testers had much to share about their experiences. One teacher commented, "We consider pieces of this [curriculum] but, we don't look at it together at once. Nothing has been written from an adolescent point of view. . . . It's a really great concept. The authors really hit into taking responsibility and being there to do it for yourself." Among the many benefits of *Finding Wheels* (Corn & Rosenblum, 2000) that were identified were: (1) opportunities to learn more about one's visual impairment, (2) opportunities to talk to adults who are nondrivers, (3) opportunities to learn more about the community, (4) development of the realization that one has options beyond the family, and (5) opportunities to learn about low vision driving as a potential option. We believe that adolescents with physical and health disabilities would gain similar benefits, especially if adults using the curriculum with students would modify the scenarios of travelers to include individuals with physical and health disabilities, an easy modification requiring minimal time.

The adults who used the curriculum with adolescents with visual impairment came to the realization that since they themselves were drivers, they could not share their own experiences with the teens. Throughout the curriculum adolescents are encouraged to interview nondrivers. One teacher

commented, "The interview my students did with a nondriver appeared to be the most helpful. It is good that they hear from people who have actual experiences in planning and using resources to meet their transportation needs."

One of the parents whose 17 year old daughter used the curriculum in California as part of an after school group led by the teacher of visually impaired students and the orientation and mobility specialist commented, "I think Finding Wheels is a wonderful class. At first I thought how much does she need to learn about this subject. Would it be a waste of her time at the end of an exhausting school day? I am very glad that we made the class a priority. It made me realize that we needed to understand Samantha's feelings about never being able to drive. This allowed us to process it as a family." Since like teachers, the vast majority of parents are themselves drivers, they often are unsure of how to broach the subject of nondriving with their child nor do they know how to adequately prepare their son/daughter for nondriving. As one of the parent field testers started to use *Finding Wheels* (Corn & Rosenblum, 2000) with her 15 year old son, she commented, "He is still willing to accept quite a bit of sugar-coated information from me about the ramifications of visual impairment—which I tend to minimize or even try to view from a positive aspect. As an older teen, he may rebel against that view a little. This [use of the curriculum] will be an interesting experience for all of us—I'm a little scared of what emotions may surface from Tom, but it's time—really time to get on with it." Four months later this mother shared with us that she and her son had both grown tremendously in their understanding of how he could be an independent nondriver when he went off to college.

THE CONTENT OF THE CURRICULUM

Finding Wheels (Corn & Rosenblum, 2000) is a curriculum manual available for purchase in standard print through PRO-ED Inc. It is divided into four sections. In the first section users meet four travelers, some of whom are more successful than others. One traveler is Pablo who is a 19 year old attending college in his local community. He uses the bus to get to many destinations. Kisha, who is 16, prefers to travel using the power of her own two feet while Maria uses a variety of methods, but questions if she is a "burden" to others. The fourth traveler, Jason, would prefer not to go anywhere alone and is very happy to sit and wait for someone to take him places. As a consequence he has a passive lifestyle. By changing the disability of the fictitious traveler in the scenarios the characters would appeal more to individuals with other disabilities. The issues faced by Pablo, Kisha, Mary Ann and Jason are very sim-

ilar to issues faced by other adolescents with disabilities (e.g., scheduling rides, budgeting, rites of passage, knowing what to share about one's disability in transit). The four travelers "talk" in language that is on a teen level. For example Pablo in his scenario says:

> My name is Pablo and I am 19 years old. I live in a small city in the Midwest. I graduated from high school a year and a half ago and am starting my third semester at the local community college.
>
> I live at home with my mom who works as a nurse in a local hospital. I have a younger sister, Angelica, who is 17 and has a car. My brother Gabriel is 15 and can't seem to talk about anything but getting his driver's license when he turns 16. Sometimes all the talk about driving and cars gets to me, but most of the time I just let it go in one ear and out the other.
>
> When I turned 16 I was really upset that I couldn't go get my driver's license like all the kids in my class. One night I got really mad at Gabriel over something stupid and started yelling my head off about how everyone hated me and treated me like a little kid. . . . I told her [mother] about all the kids at school who were talking about nothing other than getting their licenses, driving, insurance, and earning enough money to buy their own cars. I told her how lonely I felt, being the only junior who wasn't driving in the whole school and how this made me feel like a little kid.

Each scenario is followed by thought provoking discussion questions to assist teens in processing the information they have learned about the traveler. The four travelers are used throughout the curriculum to illustrate the variety of experiences of nondrivers. At the beginning of each of the ten units there is a getting started activity that refers back to one of the travelers.

The subsequent three sections of the curriculum provide the ten units of instruction (see Appendix for a list of unit titles). Each unit contains the following sections: list of student objectives, getting started activity, supporting material for adults, and recommended activities for nondrivers. Throughout the ten units there are short vignettes where other travelers are introduced and their experiences shared as they relate to the topic being discussed. Thus teens have an opportunity to hear from approximately 50 other individuals who share their own perspectives as they relate to travel options. Again, adults using the curriculum with students who have physical and health disabilities could easily substitute physical or health impairments relevant to the students using the curriculum, thus decreasing the focus on visual impairment.

In the second section of the curriculum teens explore who they are as travelers (e.g., rites of passage, knowing about their own visual impairment (or disability) as it relates to travel). Adolescents are encouraged to learn about their disability and how it impacts travel. Many have never reviewed their medical records or given thought to what pieces of information are important to share with people they meet during travel (e.g., bus drivers, dispatchers, clerks). Some students who ride bicycles may not understand why society does not allow them to drive a car while others may not realize that driving may be an option for them. Adolescents are encouraged to think of rites of passage in their own lives (e.g., confirmation or bar mitzvah, getting a job, opening a bank account) that are steps they are taking on their road to adulthood. They are helped to recognize that though driving is an important rite of passage for today's teens, it is not the only rite of passage.

In the third section teens are introduced to the variety of transportation methods (e.g., walking, public transportation, paratransit, drivers). The advantages and disadvantages of each of the methods is discussed along with considerations when using the method. Throughout this section adolescents are encouraged to explore their own community to learn what options are available or may be created.

The last section focuses on how to be an independent nondriver (e.g., budgeting, planning, what to do when a ride is late). This section also provides information on how to plan a route for a driver, how to budget for transportation, and what is socially acceptable behavior during travel.

Throughout *Finding Wheels* (Corn & Rosenblum, 2000) there are suggested activities for teens to do in order to learn about themselves and local resources. One popular activity is for teens to interview adult nondrivers. A teacher who has used the curriculum with her high school students commented about the interviews, "It is good that they hear from people who have actual experiences in planning and using resources to meet their transportation needs." Samples of other activities include: keeping a transportation diary, pricing cellular phones, looking for housing in relation to public transit, role playing what information to tell a driver, and developing a budget for monthly transportation needs. Activities are designed to be flexible based on the adolescents' needs and interests. The activities are not generally related to any one type of disability.

CONCLUSION

The adolescent years are challenging in and of themselves. When an adolescent has a disability he/she not only must face the "typical" issues of adoles-

cence but must also consider how the disability impacts who he/she is and what the future has to hold. Adolescence is traditionally a time when children move away from reliance on the family for transportation and become self-reliant be it through walking, riding a bike, public transit, using an electric wheelchair outdoors, and/or driving. For teens with disabilities maximizing their independence in regards to travel may be more complex due to the presence of a disability. Though *Finding Wheels* (Corn & Rosenblum, 2000) is not a magic cure for nondriving, it is a tool to help the youth of today explore who they are as nondrivers in our very motor vehicle dependent society.

Finding Wheels (Corn & Rosenblum, 2000) is not a standardized curriculum and it is largely based on the authors' experiences and observations of adolescents and young adults with disabilities. It is also not a "cookbook" of the how-tos of nondriving, rather it is a resource for parents and teachers to use as they guide adolescents in their exploration of independent travel as nondrivers. If you are interested in ordering *Finding Wheels* (Corn & Rosenblum, 2000) contact PRO-ED Inc. (800-897-3202), 8700 Shoal Creek Blvd., Austin, TX 78757, or by visiting their web site at <www.proedinc.com>. *Finding Wheels* costs $34 plus $3.40 for shipping and handling.

APPENDIX

Sections and Units of Finding Wheels

SECTION ONE: Teens and Young Adults Who are Finding Wheels

Pablo: "Give me that transit pass and I'm good to go."
Jason: "H—I no! I won't go!"
Kisha: "The power of my own two feet"
Mary Ann: "I'd rather not be a burden."

SECTION TWO: The Realization of Nondriving and Its Implication for Independence as an Adult

Unit 1: Understanding Visual Impairment and Its Implications for Nondriving
Unit 2: Facilitating Changing Directions: On the Road to Independent Wheels

SECTION THREE: Transportation Options for Nondrivers and Low Vision Drivers

Unit 3: Personal Wheels: Walking and Biking
Unit 4: Public Wheels: Buses, Trains, and Subways
Unit 5: Specialized Wheels: Paratransit, Charity Services, and Volunteer Services
Unit 6: Hired Wheels: Taxis and Drivers
Unit 7: Bioptic Wheels: Low Vision Driving

SECTION FOUR: Strategies for Independence as a Non-Driver

Unit 8: Funding Wheels: Budgeting, Funding, Exchanging, and Reciprocating
Unit 9: Using Wheels Efficiently: Gathering Resources, Route Planning and Time Management
Unit 10: Spinning Wheels: Coping with Non-Driving, Interpersonal Relationships, and Public Behaviors

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SELECTIVE DORSAL RHIZOTOMY: WHAT EDUCATORS AND RELATED SERVICE PROVIDERS NEED TO KNOW

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Selective dorsal rhizotomy (also known as selective posterior rhizotomy), a recently refined procedure for the treatment of spastic cerebral palsy, appears to be gaining professional acceptance. As acceptance and use grows, it is much more likely that service providers will be exposed to this treatment protocol. This review will attempt to update educators and related service providers with an overview of selective dorsal rhizotomy along with a brief discussion of its potential benefits and drawbacks.

Among the many demands on the time of educators and related service providers, the challenge to stay current on best professional practices is an ongoing and unending task. Under the pressure of multiple responsibilities, staying professionally current can be a difficult struggle. It is, however, imperative that educators and related service providers be "in the know" (Turnbull & Turnbull, 2001, p. 47) about physical disabilities and current best practices. Heller, Alberto, Forney, and Schwartzman (1996) stated that "In order to meet students' needs, teachers should be familiar with such impairments and . . . implications of those impairments" (p. 11).

The need for special education professionals to have a keen understanding of physical disabilities was best described some time ago by Dykes and Venn (1983):

> "At school, teachers most often are the professionals responsible for the child: for making sure that all information is gathered, known, and understood by the entire professional team before decisions are made. For the child who has a physical handicap, data concerning physical functioning will be especially important in planning both long and short-term interventions. Therefore, educators and other professionals

in the schools must understand not only the basic physiology and pathology related to the more frequently occurring conditions and diseases, but also should know what observations to make, what questions to ask for more information, and to whom these questions should be asked" (p. 259).

Special educators and service providers need to be current on treatment and intervention because many families will see them as the initial point of contact. Special education teachers are the most frequent point of professional contact for most parents who may not be informed of the latest treatment options. Teachers serve as conduits between parents and medical professionals because they have daily or weekly communication with the parent. Turnbull and Turnbull (2001) reported that "There is no doubt about this one fact: Families want and need information" (p. 47). Among other topics, families want information about their child's disability. They often approach the classroom teacher or related service provider for this information. Teachers must provide "state-of-the-art" information that is accessible, relevant, and time efficient (Turnbull & Turnbull, 2001).

Teachers and related personnel need to be current on treatment and intervention which will enable them to assist the child. Kirk, Gallagher, and Anastasiow (2000) underscored the importance of educators remaining current on best practices. They reported that teachers should learn as much as possible about the cause, treatment, and implications of a student's physical disability. This information is essential if teachers are to assist the child and family. The teacher should, with the involvement of the family, help the child and peers to understand appropriate aspects of the disability. Kirk et al. noted that teachers should answer questions about a disability clearly and honestly, respect the way children feel, and discuss troubling incidents that occur at school.

O'Shea, O'Shea, Algozzine, and Hammitte (2001) reported that one barrier to developing partnerships with families is a lack of knowledge concerning treatment and intervention of specific disabilities. Providing treatment information to families or interpreting medical data for families is a challenging role for any educator. There is a distinct gap between information about cutting edge treatments and the ability of families to locate, understand, and use this information (Turnbull & Turnbull, 2001).

Special education personnel need to be current on treatment and intervention to serve as a full member of the collaborative team. "In order to 'advocate' for the student with disabilities and his right to an educa-

tion, it is necessary to keep abreast of current happenings within the field" (Bigge, 1991, p. 491). Classroom teachers and related service providers for individuals with physical disabilities face significant challenges in staying current with best practices within the medical and educational fields. This is especially true in the field of cerebral palsy. For example, special education teachers, as part of the collaborative team for a child with cerebral palsy, are expected to assist the multidisciplinary team members, physician, and parents in the effort to develop more typical movement patterns (Heller et al., 1996). Such a collaborative effort is a complex task for the special education teacher due to the varied available treatment protocols including medication, surgery, orthotic devices, physical therapy, occupational therapy, and positioning devices.

In order to assist special education personnel, this article highlights the use of selective dorsal rhizotomy (SDR) for individuals with cerebral palsy. A short discussion of cerebral palsy is followed by a description of the SDR procedures along with research findings and implications.

CEREBRAL PALSY

Cerebral palsy refers to a movement disturbance that occurs as a result of damage to the motor cortex, cerebellum, or basal ganglia of the brain. Cerebral palsy is the most commonly seen cause of physical disability in children. It occurs at a rate between 1.5 and 5 cases per 1,000 live births (Hill, 1999). Generally, cerebral palsy is divided into three forms: athetotic, marked by involuntary writhing movements; ataxic, marked by balance problems; and spastic, marked by abnormally high muscle tone (Heller et al., 1996). Spastic cerebral palsy is by far the most common form comprising approximately 50 to 60% of the population of persons with cerebral palsy (Hill, 1999). Spastic cerebral palsy is the most frequently seen physical disability in school programs (Heward, 2000).

Spastic cerebral palsy can be defined clinically as "increased resistance to passive stretch of the muscles . . . causing an exaggerated tendon jerk" (McLaughlin et al., 1994, p. 755). The major gait characteristics include crouched posture, toe walking, scissoring, excessive trunk sway, dragging of the feet, and poor endurance (Bleck & Nagel, 1982).

Several treatments have been used to attempt to decrease spasticity and increase mobility. One of these treatments is selective dorsal rhizotomy (SDR).

SELECTIVE DORSAL RHIZOTOMY

Rhizotomy was first attempted by Forester in 1913 with the intent of reducing muscle tone. He was able to reduce spasticity, but the degree of sensory loss was profound and unacceptable. This procedure, coined functional posterior rhizotomy, was attempted again in 1978 with significant modifications (Nishida, Thatcher, & Marty, 1995). In 1982 it was first utilized in the United States at the UCLA Medical Center (Peacock & Arens, 1982).

Selective dorsal rhizotomy begins with a small incision in the lower back, just above the waist, typically between spinal nerves L1 and S2 (Engsberg, Olree, Ross, & Park, 1998). During the procedure the sensory nerves are separated from the motor nerves and each sensory nerve root is divided into 4–7 rootlets which are then stimulated electrically (Center for Functional Restoration, 2000). Electromyograph (EMG) responses are then used to identify the over-activated rootlets that contribute to spasticity (Montgomery, 1992). These target rootlets are selectively severed, thus reducing abnormal stimulation to the affected muscle (Heller et al., 1996).

RESEARCH FINDINGS

"Of all the surgical procedures currently performed on patients with cerebral palsy, selective dorsal rhizotomy has undergone more thorough scientific scrutiny than any other" (Center for Cerebral Palsy Spasticity, 2000). The following are recent findings for SDR with children who have spastic cerebral palsy:

- Sahrmann and Norton (1977) in a complex study using individuals with normal motor patterns and subjects with movement disorders found that upper motor neuron (UMN) syndrome is the more significant factor in primary impairments of movement, not abnormal stretch reflexes (spasticity). This finding calls into question the effectiveness of SDR on functional motor behavior.
- Peacock and Arens (1982) found improvements not only in gross motor function, but also in speech, bladder, and bowel control for persons treated with SDR.
- In a critical review of the literature prior to 1990, Landau and Hunt (1990) identified a number of unanswered questions about SDR and spasticity including: (1) Previous treatment of spasticity through pharmacologic interventions, notably Dantrolene, did not improve functional motor performance; (2) Many untreated students with spasticity tend to show an improvement in motor and intellectual functioning over an

extended period of time. The researchers note that this fact should be strongly considered when measuring the potential benefits of SDR; (3) Evidence shows that children age 3 to 8 years who have normal intelligence and are ambulatory with good strength make the best candidates for SDR. However, the investigators point out that these same children do best without any treatment; and (4) The researchers are quite skeptical of the suprasegmental effect (e.g. improvements in upper extremity motor coordination, swallowing, speech, and language), as this reported improvement may well come from simple maturation. The suprasegmental effect is thought to be due to increased cortical function above the level of the rootlet segmentation.

- Peacock and Staudt (1991) reported that SDR "reduced spasticity, thereby increasing range of motion and contributing to improvements in active functional mobility" (p. 380). This finding was confirmed using a computerized two-dimensional motion analysis procedure.
- Giuliani (1991) noted that a reduction in spasticity and an increase in joint range of motion can be observed immediately after surgery. However, increased strength and improved coordination can also be seen after a prolonged period of physical therapy.
- In a review of 50 cases, Steinbok, Reiner, Beauchamp, Cochrane, and Keyes (1992) reported a suprasegmental effect for SDR. They found the expected reduction in spasticity in the lower limbs, but also noted less spasticity in the upper limbs, theoretically as a result of the suprasegmental effect.
- McLaughlin et al. (1994) reported, "We have detected no major safety problems with SDR; no child has experienced harmful permanent sensory changes" (p. 765).
- Park et al. (1994) found that SDR: (1) halts and/or prevents partial hip dislocation, (2) does not affect hip stability, and (3) reduces the likelihood of future hip surgery.
- Heim et al. (1995) noted that SDR prevents progressive hip migration (movement of the femoral head away from the hip cavity) in the vast majority of cases. Only 4 of 45 patients who received SDR later underwent surgery for hip subluxation.
- Craft et al. (1995) found that in a six month follow-up of children treated with SDR, these children demonstrated significantly improved attentional and cognitive operations. The authors speculated that the improvements exceeded that which would be explained by either an elevated mood or reduced physical discomfort. Again, the investigators hypothesized this to be the result of the suprasegmental effect.

- Nishida et al. (1995) reported improvements in self-care and mobility. The investigators also noted that reducing spasticity may prevent contractures as the child grows.
- Chicoine, Park, & Kaufman (1997) found that younger children who have SDR have lower rates of orthopedic surgery versus those who have SDR at a later age; more specifically, heel cord lengthening, hamstring lengthening, and adductor releases are less likely to be employed after SDR.
- Steinbok, Reiner, Beauchamp, Armstrong, and Cochrane (1997), in a single-blind study, found that the scores obtained on the Gross Motor Function Measurement were significantly higher with a combination of SDR and physiotherapy compared to physiotherapy alone. The SDR group had both reduced spasticity and increased range of motion.
- Wright, Sheil, Drake, Wedge, and Naumann (1998) reported that when SDR is combined with physical and occupational therapy, this combination yields significantly greater functional motor improvement versus physical and occupational therapy alone. However, the researchers questioned the impact on daily functional activities as the surgery does not affect tone of the upper limbs.
- Engsberg et al. (1998) compared children with cerebral palsy both before and after SDR to typical children on hamstring spasticity values and hamstring strength by use of the dynamometer (an instrument for measuring the force of a muscular contraction). The authors concluded the SDR not only reduced the degree of spasticity, but also led to a statistically significant increase in strength. While the strength of children with cerebral palsy remained lower than that of typical children it showed a significant increase when compared to pre-surgery measurement.
- McLaughlin et al. (1998), in an investigator-masked randomized clinical trial, reported that: (1) at 24 months postsurgery children who had received SDR and physical therapy had significantly less spasticity than those children who had only received physical therapy as measured by the spasticity measurement system, (2) when a group of students receiving physical therapy (physical therapy only) was compared with a group receiving physical therapy and SDR, both groups demonstrated extremely similar gains in independent mobility, (3) SDR is a safe procedure with this study finding no severe adverse events, (4) SDR may not be an appropriate treatment for children with mild spastic cerebral palsy, especially those with ambulation, (5) a reduction in spasticity may not result in a corresponding reduction in primitive motor patterns, and (6) the

researchers questioned the exactness of the manner in which rootlets are chosen for excision.

- Olree, Engsberg, Ross, and Park (2000) investigated the use of SDR and its impact on synergistic movements in individuals with spastic cerebral palsy. Synergistic movement is defined as the combined action of different parts of the body working in tandem and is important for daily functioning. For example, a knee movement may also require hip and ankle movement. Individuals with spastic cerebral palsy tend to have poor synergistic patterns of movement. The researchers found that SDR even coupled with intensive physical therapy did little to improve synergistic movements. It can then be debated whether SDR, while reducing spasticity, leads to any significant improvement in overall function.
- The Center for Cerebral Palsy Spasticity (2000) reported that SDR resulted in improvements in sitting, standing, walking, and balance control.

COMPLICATIONS AND OTHER CONSIDERATIONS

Abbott (1999) noted that complications were possible both during and after the SDR procedure. Typically SDR has few significant complications, however one center reported that 15%–18% of patients suffered serious postoperative problems (Abbott, 1992).

During the procedure, the patient may face asthma attacks, upper respiratory tract infections, and aspiration into the lungs. After the procedure, the child may have temporary trunk weakness, severe pain at the site of the incision, severe spasms lasting 48 hours, temporary inability to urinate sometimes requiring catherization, "pins and needles" sensation in the legs, and small areas of permanent numbness in the legs. Cohen and Webster (1991) also reported transient cerebral spinal fluid leakage at the site of the incision in a limited number of patients. At present EMG studies have difficulty distinguishing between those rootlets that are clearly abnormal and those that are more marginal. In addition, Cohen and Webster (1991) noted the degree of abnormality in a given dorsal rootlet is "relative rather than absolute" (p. 271). Landau and Hunt (1990) pointed out that as rootlets are segmented, this may well put the individual at greater risk for scoliosis. The long-term risk for this problem has not been investigated. Steinbok et al. (1992) observed that "complications of SDR were few and not usually serious" (p. 41). Steinbok et al. (1997) later reported that a common effect of SDR is postoperative weakness in the lower limb muscles. This phenomenon is especially important as it may affect the muscles used for standing and walking.

A final consideration is the cost of the procedure. Landau and Hunt (1990) reported that the cost of SDR can approach $100,000. U.S. healthcare insurers have established specific criteria under which they will and will not pay for SDR to treat spasticity. The criteria for medical coverage requires that the patient:

1. Has tried and been unsuccessful with non-surgical procedures
2. Has strong lower extremity power
3. Has the capacity and motivation for long-term physical therapy.

The insurance group considers children ages 2–6 to be at the optimal age for this surgery and the coverage for SDR is not extended to other forms of cerebral palsy (Aetna U.S. Healthcare, Inc., 2001).

SUMMARY

As previously reported, SDR has been a well-scrutinized surgical procedure. Cutting edge technology pertaining to this procedure continues at major medical centers in the United States including: Children's Healthcare of Atlanta, Children's Hospital of St. Louis, New England Medical Clinic of Boston, Children's Memorial Hospital of Chicago, Harbor-UCLA Medical Center of Los Angeles, Beth Israel Medical Center of New York, and Children's Hospital and Regional Medical Center of Seattle. Although research continues at these centers, SDR should no longer be considered an experimental treatment. A leading medical practitioner offers the following summary concerning SDR, "Accumulated evidence and our own experience indicate that SDR is an excellent option for selected patients with spastic cerebral palsy. We think parents and patients need to inquire about SDR as a part of the management of cerebral palsy" (Center for Cerebral Palsy Spasticity, 2000).

Professionals who work with children with cerebral palsy and their parents need to be knowledgeable about SDR and its potential impact on the curriculum and services provided within the school. Educators should be cognizant of the following points:

- The IEP for a child returning to school after SDR may require modifications in the area of related services. An intensive regimen of physical therapy is an absolute requirement following SDR. If a child is not currently receiving physical therapy or receiving only a limited schedule of physical therapy, then the related services section of the IEP will require adjustments.
- The IEP for a child returning to school after SDR may require modifications in the area of placement. Due to the fact that spasticity is immedi-

ately reduced with a possible increase in strength, a change in placement to a less restrictive setting may need to be considered. This consideration may be due to a child's increased ability to perform life tasks and other functional skills. It is of note that, although SDR is major neurosurgery, a change in placement to homebound services may not be needed. Most children can return to school in a relatively short period of time and, therefore, do not require extended homebound services.

- Teachers and physical therapists need to be attuned to the fact that a number of students may become discouraged after SDR, possibly due to the intensity of the follow-up physical therapy. It is imperative for these professionals to design ways to motivate the student to maintain a positive long-term outlook.
- Teachers frequently serve as members of parent support groups and are often relied upon to bring current information and practices to the forefront. Their knowledge base should include current information about SDR.
- Decisions as to the efficacy of SDR are made on a case-by-case basis. The teacher should, of course, remain neutral about the appropriateness of SDR for a specific child as this is a medical decision.
- Teachers and physical therapists should use caution in evaluating the student's improvement following SDR. Although spasticity is almost immediately reduced, increases in strength occur following an extended period of physical therapy.
- Teachers and physical therapists should be aware that a reduction in spasticity following SDR does not necessarily lead to a reduction in primitive motor nor synergistic movement patterns.
- It has been hypothesized that improvements in both cognition and attention occur in some cases. This suprasegmental effect is more likely to be observed in the classroom rather than in other settings. Teachers should be prepared to document this effect for both parents and physicians.
- Teachers and other personnel should remain in regular contact with the physician in an effort to set challenging, yet realistic goals for the student.

In conclusion, SDR should not be considered a panacea for spastic cerebral palsy, but rather as one of many treatment options. Although SDR has received considerable professional attention, some controversy remains about the appropriateness of the procedure. As the body of research grows, clarification of unsettled issues may be resolved. Educators and related services providers need to be aware that they may be expected to serve as a link

between parents and medical professionals. It is imperative that they be well versed in current treatments for spasticity, including SDR.

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PHYSICAL, SENSORY, AND HEALTH DISABILITIES: AN INTRODUCTION

Frank G. Bowe
2000, Prentice-Hall
ISBN 0-13-660903-1
$48.00, 368 pages

BOOK REVIEW

Physical, sensory, and health disabilities: An introduction provides a wealth of information for preservice students in special education and occupational and physical therapy, and as a reference for practitioners and administrators in these fields. It is comprehensive, but not overwhelming, in its description of individuals with disabilities encompassing a variety of primary and secondary conditions and resulting unique educational and environmental needs.

The text is well organized and thorough. It is easy to read and understand for a variety of audiences. Tables, graphics, diagrams, and photos are included throughout, providing important illustrations of the disabilities and the diversity in individuals affected by them. The text also contains a wealth of resources in both online and offline options. Each chapter includes resources related to its topic as well as questions for reflection and discussion. Further, there is a comprehensive list of national organizations and groups at the end of the book. A glossary, a list of commonly used acronyms, and an extensive reference list are also provided.

The book is organized into four parts. Part One describes the fundamental ideas and recent paradigm shift in federal legislation targeted at this population. It lays the framework for the remainder of the text in its emphases on empowerment, removal of barriers, and the need for appropriate education and services. Part Two focuses on service delivery including detailed descriptions of special education and related services including early intervention, OT, PT, and SLP, instructional techniques, and assistive technology for children, youth, and young adults. Part Three provides in-depth descriptions of neurological disorders such as cerebral palsy and spina bifida, traumatic brain injury, muscular dystrophy, health impairments such as cancer, cystic fibrosis, and child abuse (e.g., shaken baby syndrome), and sec-

ondary conditions (cognitive, vision, and hearing related). Each type of disability includes a short vignette about an individual with that condition, information about causation, prevalence and incidence, effects, secondary conditions, specific needs, special education and related service needs, assistive technology, postsecondary education, employment, and independent living opportunities. Part Four supplies the reader with detailed information concerning the larger environment in terms of accessibility, housing, transportation, and employment.

Throughout, the text articulates a vision for individuals with physical, sensory, and health disabilities focusing on "we cannot be satisfied just to work on the weaknesses of our students, clients, and patients. We must work on their strengths as well. (p. 7)." Readers are expected to gain knowledge as well as become advocates on behalf of the individuals described in the text. In fact, the author, himself an individual with a disability (hearing loss), articulates a personal and professional perspective on the abilities of individuals with physical, sensory, and health disabilities.

Limitations are not discussed except within the context of environmental barriers to full participation and inclusion in everyday life (e.g., accessibility to public transportation). The text also emphasizes the need for collaboration across the agencies, programs, and individuals involved in providing services to this population. For example, in order to select an appropriate augmentative communication system, input must be gathered from the child's teacher, parent, occupational therapist, physical therapist, speech and language pathologist, and other related personnel (e.g., one-to-one aide, nurse). The author also provides both true-life success as well as not so successful stories that depict a realistic portrait of the state of the art in services for this unique population.

While the disabilities in the text are described as ranging in their severity, much of the information focuses on higher functioning individuals. Although their numbers are comparatively small, individuals with severe and profound limitations due to one or more of these disabilities often require more than the adaptations and instructional methods found in this book. Potential readers are cautioned that while this text provides a good starting point, it does not provide the in-depth information needed to meet the needs of individuals with severe, multiple disabilities. In addition, there is limited discussion of family needs and supports (e.g., caring for a child with HIV, caring for a young adult who is technology-dependent). With increasing attention to the needs of the individual within the context of the family at both the federal (IDEA, 1997) and programmatic level, it is important to include information about areas such as parent involvement and parent-professional

relationships in any text concerning children, youth, and young adults with disabilities (e.g., Dunst, Trivette, & Johanson, 1994; Leff & Walizer, 1992; Shelton & Stepanek, 1994).

Physical, sensory, and health disabilities: An introduction is an important text. It provides a wealth of information and resources to increase knowledge about and a better understanding of a unique group of individuals.

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Reviewed by
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THE EDUCATOR'S GUIDE TO MEDICAL ISSUES IN THE CLASSROOM

Frank M. Kline, Larry B. Silver, and Steven C. Russell
2000, Paul H. Brookes Publishing Company
ISBN 1-55766-485-4
$29.95, 256 pages

BOOK REVIEW

Kline, Silver, and Russell, along with a number of additional contributors, have combined their expertise as educators and physicians to produce a useful guide to medical conditions that teachers frequently confront as the concept of the inclusive classroom becomes widespread. These authors join forces in a demonstration of the cooperation and collaboration they advocate between the professions serving children in need of special care.

The aim of this book is to provide medical information that can be used by members of the educational community as they create an optimum learning environment for students with health problems. Each unit undertakes a discussion of a major category of disorders, first describing, then proposing means of intervening to assist children facing the task of learning. The book is timely. With estimates as high as 20 million American children and adolescents having some form of chronic health condition, there is a lack of medically based information specifically for educators. The authors are to be commended for providing us with a valuable resource.

In the first section, there is an overview of a multiplicity of medical conditions such as asthma, cancer, haematological diseases, etc., that may impact the child's ability to learn. Unfortunately, the list is far from complete and of much greater use is the appendix to that chapter where, in a few pages in a question format teachers can find information that is relevant in dealing with children suffering from chronic illnesses in general.

The chapter on neurological disorders, on the other hand, is detailed and explores conditions so rare that many physicians might never see them. A significant feature of this chapter is the information provided to educators

about the specific learning difficulties that may arise because of various neurological problems.

Processing disorders are analysed schematically, dividing these disorders into four areas: input (visual and auditory perception), integration, memory, and output (expressive language, fine and gross motor skills). The message presented is that empirical evidence using new medical technologies has shown that a large percentage of children with learning disabilities do in fact have underpinnings of neurological dysfunction. Such dysfunction may affect various areas of the child's information processing system and therefore learning.

Emotional and behavioural disorders received the attention of a full chapter and the authors give a good frame of reference basing their definitions on the DSM-IV with an excellent appendix at the end of the book giving different categories and diagnostic criteria. Reference is made to different pharmacological treatments, although by the nature of the time it takes to publish a book, several of the recommendations are already outdated.

The final two chapters in the section on mental health disorders deal in great depth and with great accuracy on the problems of Attention Deficit Hyperactive Disorder (ADHD) and Pervasive Developmental Disorder (PDD) which are perhaps the most important mental health conditions encountered in the classroom. Very practical and easy to develop suggestions are given for the purpose of making accommodations for children with ADHD. One gains a clear and up-to-date understanding of PDD from this chapter. In addition, there was an important commentary here on the difficulty of communication between professionals because of the extremely wide range of terms often used.

An excellent discussion with case studies of professional medical-educational interactions is presented in the final two chapters. In fact, in might be best to read these two chapters first to get a good sense of the thesis of this book.

There is an appendix on medications outlining trade names as used in the U.S.A., dosage, and side effects. It might be confusing to present teachers with a variety of dosages of psychotropic medications, and is probably too confusing, given very broad individual variability. The resource list of agencies is comprehensive but is directed to a readership in the U.S.A. Very few Canadian agencies are listed.

The authors have very successfully addressed a very complicated subject, filling a much-needed gap. With this book they are opening the door for an

enhanced communication of two professions who are linked in their care and concern for children.

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INFORMATION FOR AUTHORS

PHYSICAL DISABILITIES: EDUCATION AND RELATED SERVICES
THE DIVISION FOR PHYSICAL AND HEALTH DISABILITIES

PDERS seeks to publish articles that contribute to the field of knowledge about education and related services for individuals with physical, orthopedic or health impairments. The following are considered for publication: empirical research; theoretical perspectives; case studies which address promising practices; innovative instructional practices; and reviews of relevant books, materials, media and software.

SUBMISSIONS

Manuscripts should be submitted to: Dr. Barbara J. Kulik, 3380 Country Club Drive, Glendale, CA 91208-1718 (bkulik@csun.edu). Three copies of the manuscript, together with a diskette or email attachment of the manuscript in either WordPerfect or MicrosoftWorks in IBM PC-compatible format, should be submitted for review. All tables and figures should be included with each copy of the manuscript.

PREPARATION

The entire manuscript (title page, abstract, text, tables, figures, and references) should be double-spaced on 8 1/2 x 11-inch paper with at least a 1-inch margin on all sides. A cover sheet should include title, author(s) name and affiliation (including statements of credit or research support), address, telephone number and email of the author to whom correspondence should be directed, and a running head. The abstract should precede the text on a separate sheet of paper and should bear the full title of the article. The running head should appear on all subsequent pages.

Tables and figures should be numbered by separate series and placed at the end of the manuscript. Provide brief notes within the text to indicate where each table or figure is to appear.

Overall style should conform to that described in the *Publication Manual of the American Psychological Association*, Fourth Edition, 1994.

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PHYSICAL DISABILITIES: EDUCATION AND RELATED SERVICES

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PRESIDENT'S MESSAGE

WITHOUT A LEG TO STAND ON: THE UNRAVELING OF A TEACHING SPECIALTY IN SPECIAL EDUCATION

STEVEN E. DALEY
President, Division for Physical and Health Disabilities

The teaching specialty developed to serve students with orthopedic disabilities, physical impairments, and other health impairments is falling apart. In the United States today, there are myriad problems facing special education, including basic issues of funding, program organization, and the thorny issue of standardized testing for students who have disabilities. Within special education there are also a number of ongoing dilemmas that focus on low incidence disabilities, including the gradual decline in programs related to orthopedic impairments and other health impairments (OI/OHI). In my view we are presently witnessing the collapse of Orthopedic Impairments and Other Health Impairments as a meaningful category in special education. This disturbing situation can be viewed as a three-legged stool that is undermined by failures in teacher training programs, service delivery models, and professional organizations in special education. In this paper I will describe some of the major problems in the low incidence area of OI/OHI and propose some suggestions for the Division for Physical and Health Disabilities (DPHD).

TEACHER TRAINING PROGRAMS

Orthopedic impairments and other health impairments are longstanding as low incidence categories of exceptionality. Similarly, OI/OHI has been viewed as a category worthy of specialized training options in many college and university teacher-training programs. However, in 2002 there are very few viable teacher-training programs that specialize in OI/OHI. As example, I live in one of the most populous states in the country (California) where there are only four specialized OI/OHI teacher-training programs, and three of them are very, very small.

As teacher education programs have been revised and reviewed over the years and program productivity has been re-examined, the viability of low incidence programs has been fairly continually threatened. Many OI/OHI programs have been adversely affected by faculty retirement, faculty reassignments, and reorganizing of campus priorities. While the number of students who have OI and OHI conditions has not changed significantly, there has been a tremendous decline in the number of programs preparing teachers for careers with this unique population of students (Heller, Fredrick, Dykes, Best, & Cohen, 1999).

As many states have moved to more generic credentialing for special education, there has likewise been a trend toward generalizing the curriculum in special education teacher training programs. Faculty in many special education teacher-training programs will argue that they have infused knowledge, skills, and dispositions for working with students with OI/OHI conditions across the curriculum. Oftentimes, though, these programs have provided assurance without incorporating specialty coursework and without including meaningful fieldwork experiences into the training sequence. The result is that today there are very few training programs specializing in OI/OHI and a growing number of new teachers who are not equipped to meet the education and education-related needs of students who have orthopedic impairments and other health impairments (Heller, Fredrick, Dykes, Best, & Cohen, 1999; Stafford, Williams, & Heller, 2001).

All teachers, regular educators and special educators alike, need to function in a world where inclusion is an emerging reality. Thus, it is reasonable to expect that teacher preparation programs must provide adequate training for meeting the needs of students with disabilities in regular education settings. For many regular education teachers, there is a need for ongoing support and assistance to meet the educational needs of students with OI/OHI in regular education settings. Said simply, the special education teacher *must* have skills to provide consultant help in the regular education classroom. While some teacher education programs provide opportunities for teacher candidates to gain skills in inclusive settings, all too often this is not the case. In my view, there is still a long distance to go to realize the ideal that special education is a portable *service*, not a specialized or segregated *place*.

While OI/OHI is obviously a low incidence area, it is important to acknowledge that there is a critical personnel shortage in all areas of special education. In many sections of the country there has been a failure of teacher training programs to prepare adequate numbers of new special education teachers in all areas, categories, and program. This situation has been exacerbated by administrative decisions to provide educational personnel for stu-

dents with OI/OHI by assigning teachers who are only partially credentialed or are credentialed to provide service to students with high-incidence disabilities (e.g. LD, mild disabilities). Taken together, the situation described here translates into an extreme shortage of trained teachers available to meet the unique needs of students with orthopedic impairments and other health impairments wherever they are placed.

Service Delivery: Educational Placement and Educational Services for Students with OI/OHI

There was a long period in special education where students with orthopedic impairments and other health impairments were placed in special classes, and in many communities these special classes were housed at segregated sites. These isolating programs were a hallmark of specialization in special education. In many school districts, OI/OHI programs were in place long before the passage of federal legislation requiring the provision of special education to all eligible students with disabilities. With continued and expanded placement of students with disabilities into regular classrooms, the era of segregated programs in OI/OHI has diminished. For the most part, students with OI and OHI are now educated in regular classrooms. For most of these students, education experiences are directed by regular education staff. While this shift in placement practices has afforded many more opportunities for meaningful inclusion, there remain a number of substantial barriers to student success in these regular education classrooms (Heller, Fredrick, Best, Dykes, & Cohen, 2000).

Over the past 25 years, there have been significant legislative mandates requiring the provision of special education services to students with disabilities. During this same period, many school administrators and other district personnel have increasingly supported the placement of students with physical impairments and other health impairments into regular classrooms. In large part, placement in regular schools and regular classes has been accomplished because regular classroom teachers have been assured that these students can participate in the same academic activities as their peers. Many of these students do require little in the way of specialized educational interventions. While it may be open to challenge, the inclusion of students with OI/OHI has been hailed as a success.

Another important aspect of administrative decision-making in special education is the decision to reclassify students and/or classes. While few administrators will openly admit it, students with OI/OHI conditions are sometimes placed in classrooms organized and classified as *severe disabilities* or *multiple disabilities* classes. Many special education teachers who do not have

the specialized OI/OHI credentials required in many states do hold credentials authorizing services to students with multiple disabilities or severe disabilities. This reassignment practice is predicated on a long-outdated idea that it is reasonable to place students into specialized settings based on their disability label. This is a discriminatory practice that should not be continued. I urge you to speak against this harmful practice the next time you witness it during an IEP meeting.

Some regular education teachers benefit from ongoing consultation with OI/OHI teachers, but most regular education teachers simply make it up as they go. Said differently, most regular education teachers are being asked to provide specialized educational interventions for students with OI/OHI without specialized training in meeting the educational needs of this unique population (Heller, Fredrick, Dykes, Best, & Cohen, 2000). To compound this problem, many of these dedicated teachers are asked to meet the needs of students with OI/OHI without the benefit of meaningful, ongoing consultation from special education staff members. If you doubt these claims, I invite you to visit almost any elementary school in the United States and see if you find a different situation. I sincerely hope you do!

CEC as a Professional Organization in Special Education

The Council for Exceptional Children (CEC) has played an important and meaningful role in shaping the development of special education for children with disabilities. But sometimes I think that CEC is slowly fading from a central role in the field, perhaps struggling with a case of *hardening of the categories*.

CEC is organized as a collection of specialty categories (called Divisions). These groups were organized to meet the unique needs of personnel in special education in a time when special education was primarily a set of separate and segregated specialty programs. The principal change is that more and more educational service is not organized by categories, with most all services provided by a regular education teacher who has little or no training in OI/OHI or other narrowly defined category of exceptionality. Paralleling this dramatic shift in service delivery, CEC membership is down and has been declining for a long period. For DPHD, the drop in numbers is staggering: from a high of 2043 in June of 1990 to an all-time low of just over 800 in November 2001.

Cost is likely a factor in membership numbers. Full membership in CEC, with no additional fees for division membership, ranges from $84 to $99 (depending on your state of residence). There are tens of thousands of regular education teachers providing special education services to students with

disabilities across the United States. Very, very few of these teachers belong to CEC. I do not know about you, but I have only met a handful over the years, and each one was also trained in special education!

In 2002, depending upon your perspective, we are either successfully including students with OI/OHI in regular settings, or we are not. Regardless, I would submit that CEC is not presently an important vehicle for supporting the many populations working to support students with OI/OHI. These populations include teachers, teaching assistants, related personnel (nursing, speech pathology, OT, PT), students, administrators, family members, and university faculty. As a parent organization, CEC acts in a central way to diminish the importance of our work with students who have OI and OHI. CEC continues to limit membership options for personnel from other fields and refuses to consider membership in specialty divisions without membership in the parent organization. Thus, for a speech pathologist or a nurse to belong to DPHD, the annual membership cost is prohibitive (over $100 annually). Cost is often cited as an issue that mitigates against membership for speech pathologists, school nurses, and others who work with students who have OI/OHI. Thus, many of the personnel who might benefit from membership do not belong to DPHD. But that is really only part of the problem.

Professional organizations in education and related fields have long subsidized students as members while they engage in training in colleges and universities. Reduced-fee memberships provide a great resource for new professionals in the field and can engender long-term involvement in the professional organization. CEC refuses to allow reduced fees for students who are also working in the field while they go to school. Substantial numbers of teachers are working in special education without full credentials while they complete their education and training to become fully certified teachers. CEC should be doing everything possible to recruit and maintain student members. They are the life-blood of any organization and CEC just misses the point.

CEC may have started out doing a good job of representing the ongoing professional needs of special education teachers. In the meantime, however, the world has changed and special education teachers are not the only ones working with many students who have disabilities. Thus, it may be reasonable to consider that CEC does not represent teaching in the field of special education. According to The U.S. Department of Education, Office of Special Education Programs, there were over 350,000 teachers providing special education and related services to students with disabilities (ages 6–21) in the 1997–1998 school year. CEC membership is approximately 50,000. Even

if all the members of CEC were teachers that would be a membership rate of something less than 15 percent. It is more likely somewhere in the neighborhood of 5–10 percent of the teachers delivering special education services belong to CEC. Something is not right with percentages this low and CEC *must* open a significant dialogue on this critical issue in membership.

The Future of DPHD

As the current president of the Division for Physical and Health Disabilities of the Council for Exceptional Children, I am distressed to bear witness to an unraveling of a long-standing teaching specialty in special education. As a classroom teacher, a program specialist, and a university faculty member in special education, I have been working with children who have OI/OHI conditions and have been training teachers for careers with this population of students for many years. I am now realizing that I have quietly watched as this specialty area gradually crumbled over the last 20 years. Of even greater concern, it is not clear to me that there is a way out of the current dilemma, and I now believe that a virtual collapse of this teaching specialty is close at hand. If we are to be successful in meeting the educational needs of students who have orthopedic disabilities, physical impairments, and other health impairments in this new century, we will need to overhaul the entire remaining remnants of a dying specialty area and rebuild for a new era. And we need to do this quickly.

The three-legged stool is teetering. A great deal of thoughtful, committed work must be targeted to the area of OI/OHI if it is to continue as a viable teaching specialty within special education. As current president of DPHD, I offer my recommendations for the future of our shared work to support the education of students with OI/OHI through revision of teacher training programs, changes in practice in the field, and reconsideration of the professional organization:

Teacher Training

- Teacher training in special education must provide a thorough knowledge base in OI/OHI for *all* students in special education training programs.
- Regular education teacher training programs must combine efforts with special education training programs to provide opportunities for *meaningful* involvement with students who have OI/OHI as an ongoing, regular part of teacher training.
- Colleges and universities must build stronger partnerships with local education agencies to provide meaningful, affordable opportunities for pro-

fessional development for *all* personnel working with students who have OI/OHI.
- Training opportunities must include skills development in collaboration and consultation to enhance success in the regular classroom for students with OI/OHI.
- Training for *all* school administrators must include a substantial knowledge base about, and meaningful experiences with, students who have OI/OHI.

DELIVERING SPECIAL SERVICES IN REGULAR SETTINGS
- Placement in regular education classrooms must be provided as a viable option for every student with OI/OHI.
- Placement in regular classrooms must include ongoing, sufficient resources to ensure a successful educational experience for students with OI/OHI.
- Special education must be reconceptualized as a set of services that are portable and follow the student; special education is not a place.
- Additional emphasis on the role of the special education staff and the classroom staff must target an expanded role for each. It is not acceptable that students with OI/OHI are only provided with learning opportunities when the special education teacher either comes to the classroom or pulls the student out for specialized, segregated intervention.

CEC AS A VITAL PROFESSIONAL ORGANIZATION
- Adopt and support implementation of specialized standards to support and direct education interventions with *all* low-incidence populations in special education programs in the United States.
- Lower overall membership cost to encourage membership by a larger portion of the personnel working in special education.
- Meet in affordable cities. Consider regional meetings instead of a national meeting. Stop meeting in expensive cities (e.g., New York City in April 2002).
- Encourage student membership for *all* students in special education training programs, and remove barriers that prohibit membership for those already working in the field.
- Develop affiliate membership status for professionals from other allied fields. Drop the requirement of basic membership in CEC as a prerequisite for division membership. This would permit professionals from OT, PT, Nursing, School Psychology, Speech Pathology, and other related

areas to belong to specialty divisions within CEC at an affordable annual cost.
- Reconsider the term Divisions. They are divisive.
- Stop engaging in trivial and degrading fund raising activities that diminish the image and the possibilities of student with disabilities (e.g., Christmas card sales).

I hope my ideas, reflections, and perceptions have caused you to think about the Division for Physical and Health Disabilities in new ways. We are at a unique junction in the maturing field of special education for students with orthopedic impairments and other health impairments. We need to move beyond the end of the current era and work together to create a new structure that will support the ongoing efforts of the many people who are deeply and sincerely committed to students who have OI/OHI. Students who have OI/OHI deserve nothing less than our full commitment to the reorganization of special education to better meet their current educational needs and to more fully prepare them for lives as full-participants in our society.

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ESSENTIAL ELEMENTS OF EFFECTIVE TEAMWORK: SHARED UNDERSTANDING AND DIFFERENCES BETWEEN SPECIAL EDUCATORS AND RELATED SERVICE PROVIDERS

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ABSTRACT

Collaborative teamwork is viewed by many as a characteristic of effective working relationships between adults who provide special education and related services in educational settings. Although a substantial body of research exists on the philosophy and practice of collaborative teamwork, the contributions of veteran team members regarding which elements of this knowledge base they view as essential has been largely absent. The purpose of the present study was to obtain the opinions of practicing team members regarding those elements of teamwork they found essential, as well as those they view as non-essential, to their professional practice. The responses of 46 team members (17 special educators, 9 occupational and physical therapists, and 20 speech and language pathologists), were obtained through their completion of a questionnaire. The questionnaire was organized according to three professional practice themes of teamwork: 1) the philosophy of collaborative teamwork; 2) collaborative team structures; and 3) collaborative team functions. Team members indicated which elements within each professional practice theme they viewed as essential to the knowledge base for service on collaborative educational teams. Responses were variable within and across the three themes with the strongest support expressed

for the process of collaborative problem solving. The implications of these data for the practice of collaborative teamwork in contemporary public schools are explored.

The effectiveness with which adults work together in educational settings is an area of interest and concern as reflected in the research on contemporary schooling practices (Friend & Cook, 2000; Lipsky & Gartner, 1997; Utley & Rapport, 2000; Walther-Thomas, Korinek, McLaughlin, & Williams, 2000). Indeed, the extensive professional literature on teamwork is replete with descriptions of those elements associated with team effectiveness.

A framework that may be used to organize the literature base to date is to conceptualize the elements of teamwork along three dimensions: 1) the philosophical underpinnings of teamwork; 2) the structures (formal and informal) that impact the dynamics of how team members interact with one another; and 3) the functions, or activities, of service provision through which team members practice their disciplinary expertise.

A number of authorities have described the necessity for members of a single team to share a similar philosophy about their collective work. Some of the beliefs that underlie active engagement in a transdisciplinary team model include recognition of the need to share discipline-referenced methods with one another (Campbell, 1987; Hutchinson, 1978; Utley & Rapport, 2000; Woodruff & McGonigel, 1988), a willingness to adopt processes or norms that guide *interaction* between team members (Friend & Cook, 2000; Walther-Thomas, Korinek, McLaughlin, & Williams, 2000), and active integration of parents as full participants in all aspects of teamwork (Carney & Gamel-McCormick, 1996; Giangreco, Cloninger, & Iverson, 1993; Orelove and Sobsey, 1996).

A second dimension of teamwork examined in the literature is the set of *structures* that underlie the ability of adults to work together. Some of the structures include interpersonal and communication skills development (Begin, Gallagher, & Kindred, 1997; Friend & Cook, 2000), an understanding of the stages of professional development that may impact team members individually, as well as how those stages may be influenced when change or innovation is introduced into the educational setting, (Orelove and Sobsey, 1996; Walther-Thomas, Korinek, McLaughlin, & Williams, 2000; Whitaker, 1993), sensitivity to how one another's roles are defined (and expanded as appropriate) (Dunn, 1991; Giangreco, 1996; Rainforth, York, & Macdonald, 1992), and some typical leadership styles, as well as team member roles, that

are fulfilled in the context of team meetings (Fox & Williams, 1991; Givner & Haager, 1995).

A review of the literature on structures through which team members relate to one another often reveals the term *collaboration* (Friend & Cook, 2000; Walther-Thomas, Korinek, McLaughlin, & Williams, 2000). Although the term collaboration is used frequently in conjunction with the concept of teamwork, the two terms are not synonymous. Friend and Cook (2000) describe collaboration as a style for direct interaction. Collaboration may also be described as the nature of the interpersonal relationship between equal parties as they work toward a common goal. Professionals who value collaboration as an interaction style hold a belief that the expanded expertise that becomes available in this context leads to outcomes that are superior in quality to those achieved by people working in isolation from one another (Utley & Rapport, 2000).

A third dimension of teamwork addressed by a number of authorities is service provision, specifically the collective fulfillment of a range of team functions or activities. These activities typically begin with assessment and continue through the processes of IEP development, implementation, and evaluation (Lipsky & Gartner, 1997; Orelove & Sobsey, 1996). These functions may be conceptualized as the "work" of teams.

Despite the substantive focus on teamwork and collaboration in the professional literature, the knowledge base of effective teamwork elements remains relatively uninformed by the voices of those who are part of this process. Indeed, despite the depth and breadth of professional interest on this topic, the opinions of veteran team members regarding what *they* believe to be essential knowledge and skills for effective team membership is largely missing. The present study provides some preliminary data regarding the viewpoints of veteran team members as to which teamwork elements they found essential for their professional practice in educational settings. Specifically, the opinions of these team members were solicited to determine their level of agreement or disagreement with the broad range of elements associated with effective teamwork drawn from the literature. These data were collected as well to help reveal if team members from various disciplines have a *shared* understanding of what it means to be a team. The degree to which members from the traditions of both special education and allied health (related service providers) share an understanding of effective teamwork elements may offer insight as to the continuing struggles some team members experience as they go about their collective work. These data may also suggest that those areas that reflect *differences* in understanding between special educators and related service providers be addressed for members of

both groups at the pre-service level (Givner & Haager, 1995; Pugach, 1996), as well as in the arena of professional development (Lipsky & Gartner, 1996; Sands, Kozleski, & French, 2000).

METHOD

PARTICIPANTS

The participants in this study were 17 special educators and 29 related service providers (9 occupational and physical therapists as well as 20 speech and language pathologists). All participants in this study were employees of one, or both, of two agencies in Western Pennsylvania. One agency served children with disabilities of preschool age under a contractual agreement with the Department of Education in the Commonwealth of Pennsylvania. The second agency, whose employees served children and youth of school age, was an Intermediate Unit. Intermediate Units are the middle tier of a three tiered public educational system in the Commonwealth of Pennsylvania. Each Intermediate Unit is comprised of representatives from neighboring school districts who collectively provide some services to students with low incidence disabilities, and also provide technical assistance to teachers and other professionals in the delivery of educational and related services.

The group of special educators served children with low incidence disabilities and was comprised of three teachers of school age children; the remaining six were early intervention service providers. The nine occupational and physical therapists provided related services across all nine classrooms in which children with low incidence disabilities were served; the speech-language pathologists served these same classrooms but also served children and youth with less severe disabilities across a range of early intervention and school-age programs throughout the county.

Professionals from both agencies collaborated on a federally funded project designed to promote the application of innovative practices in collaborative teamwork. The participants had served children and youth with disabilities and their families for an average of 14 years; the range of experience was 2–27 years. Thus, this group was not new to the field, or their professions, and could be considered to be veterans in their work.

QUESTIONNAIRE DEVELOPMENT

The opinions of the participants regarding essential elements of effective teamwork were obtained through completion of a questionnaire designed explicitly for this purpose. The content of the questionnaire was based on a review of the literature in special education and related services. This review identified the opinion of authorities as to the knowledge and skills that are viewed as essential for special educators and related service providers to engage in effective teamwork. The intent in administering the questionnaire was to gain the opinion of veteran team members on which elements of this knowledge base they considered essential to their practice of effective teamwork.

The questionnaire consisted of three sections, each describing a particular *theme of professional practice* in effective teamwork. Organization of questionnaire items into the themes of professional practice was based on the conceptual framework used to review the professional literature on this topic. The themes of professional practice were: 1) the philosophy of collaborative teamwork; 2) collaborative team structures; and, 3) collaborative team functions.

The three themes of professional practice were further organized into multiple *theme components*, each focusing on a particular dimension of the professional practice theme. An example of a theme component in the first professional practice theme (philosophy of collaborative teamwork) was *the benefits of the transdisciplinary team;* an example in the third professional practice theme (collaborative team functions) was *IEP development.*

The questionnaire consisted of 82 items distributed across the three professional practice themes; each item described an element of teamwork. The sections of the questionnaire varied in the number of items; this was dependent, at least in part, upon the relative frequency of published work that addressed each component. Table 1 summarizes the organizational framework of the questionnaire according to the three professional practice themes, the more detailed theme components, and the number of questionnaire items in each section. The content of an early draft of the questionnaire was supplemented with input from various professionals before administration of the questionnaire was undertaken.

Study participants responded to each questionnaire item by indicating whether they *agreed* that the teamwork element described was an essential element of the knowledge base for special educators and related service providers to work together effectively, or whether they believed an item

TABLE 1.
Organizational Structure of the Questionnaire into Three Professional Practice Themes

Title of Professional Practice Theme	Title of Theme Component	Number of Items
Philosophy of collaborative teamwork	An historical perspective on various models of team functioning	4
	The benefits of the transdisciplinary team	3
	Legal justification for the provision of related services	4
	Resolving differences in team philosophy	7
Collaborative team structures	The concept of "stages" of professional development and the relationship of these stages to change	7
	Interpersonal communication	19
	Determining the form(s) of role expansion	11
	The "mechanics" of team interaction	5
Collaborative team functions	The types and order of assessment practices	4
	IEP/Program development	8
	IEP/Program implementation	5
	IEP/Program evaluation	5

reflected a *nonessential* element of the knowledge or skills in the repertoire of effective team members.

RESULTS

The relative degree of support for each teamwork element is expressed as a percentage of team members who agreed that an element of teamwork was essential to their professional practice. Table 2 summarizes the opinion of these respondents for all 82 items of the questionnaire. Within Table 2, the percentages of agreement for each questionnaire item are displayed for the total number of study participants, as well as separately for the group of special educators and the combined group of related service providers (occupational and physical therapists, speech-language pathologists). As revealed in Table 2, the results were variable across all three professional practice themes, as well as across theme components within professional practice themes. Generally, however, the majority of the teamwork elements articulated in this questionnaire were viewed positively by the majority of these respondents regardless of their disciplinary framework. Seventy-one percent (n = 58) of the 82 questionnaire items were rated as essential by 60% or more of the members from both groups, with 24% (n = 20) of the items rated as essential by 80% of the respondents. Only 4% (n = 3) of the items were rated essential by less than 50% of these veteran team members.

In addition to the generally positive regard for the content of the questionnaire expressed by the majority of these respondents, the results shown in Table 2 also reveal that these respondents expressed shared agreement on some specific elements of the teamwork knowledge base, as well as differences on other teamwork elements. Shared agreement can be inferred if members of both groups expressed high percentages of agreement regarding the essential nature of certain teamwork elements, as well as low percentages of agreement across both groups regarding a particular teamwork element. Differences between the two groups can be inferred if there was a substantial difference in the percentage of agreement expressed by members of both groups regarding whether an element was essential (or not) to the practice of effective teamwork.

Those items with shared agreement may reflect shared meaning, or shared understanding of what it means to be a team. Those items with substantive differences between the two groups may suggest that members of the two groups viewed teamwork in dissimilar ways. To explore the similarities and differences between the two groups, three forms of data analysis were undertaken: 1) those elements of the knowledge base that enjoyed particu-

TABLE 2.
Percentage of Support for All Questionnaire Items Across the Three Practice Themes

Title of Theme Component	Topic of Questionnaire Item	Percentage of *All* Respondents (Across Disciplines) Who Rated the Item as Having Value for Team Members	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Rated the Item to Have Value for Team Members
An historical perspective on various models of team functioning	1. The origin of the multidisciplinary team; roles and responsibilities	74%	72%	76%
	2. The origin of the interdisciplinary team; roles and responsibilities	78%	76%	82%
	3. The origin of the transdisciplinary team; roles and responsibilities	80%	83%	76%
	4. Professional practices that facilitate and interfere with the integrated delivery of related services	76%	76%	76%
The benefits of the transdisciplinary team	5. For students and families (longitudinal vs. episodic implementation of thera-	76%	69%	76%

	peutic input)			
	6. For teachers and related service providers to engage in joint problem-solving	85%	83%	88%
	7. How this team structure may meet the need to "belong"	43%	41%	53%
Legal justification for the provision of related services	8. Definition of related services in IDEA	87%	90%	82%
	9. Outcome of the Rowley Case re. the provision of related services	74%	66%	88%
	10. Outcome of the Tatro Case re. the provision of related services	72%	66%	82%
	11. Implications of federal legislation for provision of related services in early intervention	87%	93%	76%
Resolving differences in team philosophy	12. The importance of team members from all disciplines sharing a common philosophy about teamwork	89%	86%	94%
	13. The importance of team members from all disciplines sharing the belief that they are responsible for sharing and combining their methods, and applying their techniques across a range of environments	93%	93%	94%
	14. Clarification of the misconceptions about transdisciplinary team function-	83%	86%	76%

TABLE 2.
Continued

Title of Theme Component	Topic of Questionnaire Item	Percentage of *All* Respondents (Across Disciplines) Who Rated the Item as Having Value for Team Members	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Rated the Item to Have Value for Team Members
	ing (e.g., providing therapy in a classroom is "integrated therapy")			
	15. Implementation of the transdisciplinary team model results in consistent and comprehensive programs to a greater degree than multi- or interdisciplinary approaches	65%	66%	65%
	16. Higher program quality results from collaborative teamwork when compared with teams whose members work in isolation	80%	90%	65%

	17. A team approach to assessment facilitates a focus on the "whole" child	89%	93%	82%
	18. Importance of parents as team members in supporting the need for related services as well as how those services are provided	89%	86%	94%
The concept of "stages" of professional development; the relationship of these stages to change and innovation	19. The stages of professional development (e.g. renewal)	30%	17%	53%
	20. Impact of change or innovation may require adjustment in the stages of professional development	37%	24%	59%
	21. The stages of concern about innovation	37%	17%	71%
	22. Levels of use of an innovation (e.g., introduction, routine use)	28%	14%	53%
	23. Use of situational leadership to respond appropriately to fellow team members who are experiencing change or innovation	41%	38%	47%
	24. Rationale for, and techniques to maintain self-concept and positive attitudes during change or innovation	63%	52%	82%
	25. The possibility of increased vulnerability during change and innovation	28%	21%	41%
Interpersonal communication	26. Definition of interpersonal communication	61%	52%	76%

TABLE 2.
Continued

Title of Theme Component	Topic of Questionnaire Item	Percentage of *All* Respondents (Across Disciplines) Who Rated the Item as Having Value for Team Members	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Rated the Item to Have Value for Team Members
	27. Enhancement of communication skills through mutual respect, active listening, as well as jargon-free oral and written communication	80%	83%	76%
	28. Paraphrasing words of the speaker as a form of validating the perception of a message	59%	62%	53%
	29. Importance of effective non-verbal communication	50%	52%	47%
	30. Examples of effective non-verbal communication methods	39%	41%	35%

31. Basic sources of misunderstanding that may produce communication failures	80%	83%	76%
32. Methods of effective oral communication (e.g., organization of thought before speaking)	72%	72%	71%
33. Methods of effective written communication (e.g., avoidance of jargon)	76%	76%	76%
34. Use of active, ongoing listening skills	57%	55%	65%
35. Method of acknowledging the viewpoints of others during interaction	50%	55%	41%
36. Problem-solving strategies that result in satisfactory group decisions	98%	97%	100%
37. Decision-making processes for IEP planning, implementation, and evaluation	96%	96%	100%
38. Guidelines for the constructive and objective use of feedback	87%	86%	88%
39. Guidelines for giving and receiving positive comments	61%	57%	65%
40. Giving "credit" to fellow team members	52%	45%	65%
41. Management of conflict and/or confrontation during team meetings	85%	83%	88%
42. Sources of true conflict (e.g., difference about beliefs)	59%	52%	71%

TABLE 2.
Continued

Title of Theme Component	Topic of Questionnaire Item	Percentage of *All* Respondents (Across Disciplines) Who Rated the Item as Having Value for Team Members	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Rated the Item to Have Value for Team Members
	43. Sources of school conflict (e.g., differentiation of functions)	65%	59%	76%
	44. Conflict/confrontation management within the school organization	80%	72%	94%
Determining the form(s) of role expansion	45. Definition of role transition	67%	62%	76%
	46. Processes of role transition (e.g., role extension, role enrichment)	72%	66%	82%
	47. Identification of when a particular level of role transition is appropriate or inappropriate	65%	66%	65%

	48. Practices to support role transition (e.g., share information with colleagues during assessment)	78%	83%	71%
	49. Definition of collaborative consultation	80%	83%	76%
	50. Stages of the collaborative consultation process	85%	93%	71%
	51. Guidelines for use of interpersonal skills during the collaborative consultation process	46%	38%	59%
	52. Levels of readiness to enter a consultative relationship	63%	55%	76%
	53. Assessment of the readiness to enter a consultative relationship	65%	59%	76%
	54. Overcoming unwillingness to enter a consultative relationship so acceptance can be gained	78%	76%	82%
	55. The "stages" of learning of the consultee and its impact on the consultative relationship	54%	59%	47%
The "mechanics" of team interaction	56. Elements of effective teams (e.g., Joint goal setting)	87%	83%	94%
	57. Steps in conducting a team meeting	80%	79%	82%
	58. The importance of rotating the role of team leader during team meetings	70%	59%	88%

TABLE 2.
Continued

Title of Theme Component	Topic of Questionnaire Item	Percentage of *All* Respondents (Across Disciplines) Who Rated the Item as Having Value for Team Members	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Rated the Item to Have Value for Team Members
	59. The importance of rotating the role of recorder during team meetings	63%	45%	94%
	60. Typical leadership styles (e.g., "selling," delegating)	76%	66%	94%
The types and order of assessment practices	61. Use of ecological/environmental techniques to identify the contexts and functional targets for instruction	63%	62%	65%
	62. Use of discipline-specific assessment to determine how an individual's disability may influence his or her functioning on potential IEP objectives	87%	93%	76%

	63. Team assessment data are the foundation for collaborative problem-solving to develop a profile of student strengths and needs	87%	86%	88%
	64. Team members commit to an ongoing assessment process including observation in a variety of environments	93%	93%	94%
IEP/Program development	65. Teams use a collaborative process for IEP development including assessment data from which interventions are developed	87%	86%	88%
	66. Team members relate priorities from the perspective of their own disciplines across a range of environments	74%	79%	65%
	67. Priorities that form the basis for the IEP are determined jointly through a process referenced to environmental demands	83%	90%	71%
	68. Members of multiple disciplines integrate their methods into a single IEP	85%	83%	88%
	69. Goals generated in isolation may exclude objectives necessary for integration of students' skills across environments	78%	72%	88%

TABLE 2.
Continued

Title of Theme Component	Topic of Questionnaire Item	Percentage of *All* Respondents (Across Disciplines) Who Rated the Item as Having Value for Team Members	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Rated the Item to Have Value for Team Members
	70. The importance of having parents and family members attend assessment and planning activities prior to the formal IPE meeting to select priority goals	80%	76%	88%
	71. The selection of intervention methods is determined by team members in a decision making process	89%	83%	82%
	72. How intervention methods from multiple disciplines can be combined to promote acquisition of functional skills across environments	87%	90%	82%

IEP/Program implementation	73. A variety of data collection strategies are used to monitor intervention effectiveness	74%	79%	65%
	74. Interventions are selected jointly, as are the evaluation criteria for determining the effectiveness of the intervention	78%	79%	76%
	75. Intervention plans are developed by the team	89%	93%	82%
	76. Individualized adaptations are to be developed by various team members to maximize student participation across environments	80%	86%	71%
	77. Team members determine when, and by whom, interventions will be implemented in a decision making process	87%	90%	82%
IEP/Program evaluation	78. Team members collaborate in a data-based process to evaluate the IEP	67%	66%	71%
	79. Data are used to signal the need for adjustment to an intervention plan	76%	76%	76%
	80. A variety of data collection strategies are used to assist the process of problem identification and clarification re. the success or failure of an intervention	72%	72%	71%

TABLE 2.
Continued

Title of Theme Component	Topic of Questionnaire Item	Percentage of *All* Respondents (Across Disciplines) Who Rated the Item as Having Value for Team Members	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Rated the Item to Have Value for Team Members
	81. Brainstorming is used to problem solve alternative interventions	89%	90%	88%
	82. Alternative goal selection is guided by the application of criteria determined by the team in a problem-solving process	76%	83%	65%

larly high agreement across special educators and related service providers as to their importance in the practice of effective teamwork; 2) those teamwork elements that were viewed as having little value by either group; and 3) teamwork elements that were viewed differently by the group of special educators and the group of related service providers.

SHARED AGREEMENT ACROSS BOTH GROUPS REGARDING ESSENTIAL ELEMENTS IN THE KNOWLEDGE BASE

Shared agreement as to the importance of particular elements of effective teamwork was determined by analyzing those items rated as essential by 80% or more of the members of each group. Of the 82 items in the questionnaire, this criterion was met on 20 items distributed across all three professional practice themes. The items that met this criterion of shared agreement are summarized in Table 3; results specific to each professional practice theme, and related theme components, are reported in the same order as the organization of the questionnaire.

Professional Practice Theme I—Philosophy of Collaborative Teamwork

The first theme component that included a questionnaire item meeting the criterion of shared agreement was *The benefits of the transdisciplinary team*. The item stated that transdisciplinary teamwork is beneficial because it provides access to joint problem solving. *Legal justification for the provision of related services*, the subsequent theme component, also produced one questionnaire item that was rated essential by over 80% of the respondents in both groups. This item articulated the legal definition of related services within IDEA.

The theme component *Resolving differences in team philosophy* included four questionnaire items that were rated "essential" by both groups. The first of these items articulated the importance of team members sharing a common philosophy. A second item within this theme component described the importance of team members sharing a belief that members from *all* disciplines are responsible for sharing and combining their methods, and applying their techniques across a range of environments. This item generated almost identical levels of agreement across the two groups; ninety-three percent of related service providers and 94% of special educators rated this belief as essential to effective teamwork.

TABLE 3.
Agreement of At Least 80% Across Both Groups Regarding the Essential Nature of the Teamwork Elements

Title of Theme Component	Topic of Questionnaire Item	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Judged the Item to Have Value for Team Members
The benefits of the transdisciplinary team	For teachers and related service providers to engage in joint problem-solving	83%	88%
Legal justification for the provision of related services	Definition of related services in IDEA	90%	82%
Resolving differences in team philosophy	The importance of team members from all disciplines sharing a common philosophy about teamwork	86%	94%
	The importance of team members from all disciplines sharing the belief that they are responsible for sharing and combining their methods, and applying their techniques across a range of environments	93%	94%
	A team approach to assessment facilitates a focus on the "whole" child	93%	82%
	Importance of parents as team members in supporting the	86%	94%

TABLE 3.
Continued

Title of Theme Component	Topic of Questionnaire Item	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Judged the Item to Have Value for Team Members
	need for related services as well as how those services are provided		
Interpersonal communication	Problem-solving strategies that result in satisfactory group decisions	97%	100%
	Decision-making processes for EP planning, implementation, and evaluation	96%	100%
	Guidelines for the constructive and objective use of feedback	86%	88%
	Management of conflict and/or confrontation during team meetings	83%	88%
The "mechanics" of team interaction	Elements of effective teams (e.g., joint goal setting)	83%	94%
The types and order of assessment practices	Team assessment data are the foundation for collaborative problem-solving to develop a profile of student strengths and needs	86%	88%
	Team members commit to an ongoing assessment process including observation in a variety of environments	93%	94%

TABLE 3.
Continued

Title of Theme Component	Topic of Questionnaire Item	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Judged the Item to Have Value for Team Members
IEP/Program development	Teams use a collaborative process for EP development including assessment data from which interventions are developed	86%	88%
	Members of multiple disciplines integrate their methods into a single EP	83%	88%
	The selection of intervention methods is determined by team members in a decision making process	83%	82%
	How intervention methods from multiple disciplines can be combined to promote acquisition of functional skills across environments	90%	82%
IEP/Program implementation	Intervention plans are developed by the team	93%	82%
	Team members determine when, and by whom, interventions will be implemented in a decision making process	90%	82%
IEP/Program evaluation	Brainstorming is used to problem solve alternative interventions	90%	88%

Two other items with shared levels of high agreement within this theme component—how team approaches to assessment facilitate a focus on the "whole" child, and the importance of parents to effective teamwork—support the need for related services, and in shaping how those services are provided.

PROFESSIONAL PRACTICE THEME II—TEAM STRUCTURES

Two of the four theme components in the second professional practice theme included items rated as essential by 80% or more members of both groups. The first of these theme components was *Interpersonal communication.* This was the largest theme component in the questionnaire, consisting of 19 items. Of this total, four items were rated as essential: 1) problem solving strategies; 2) decision-making strategies; 3) constructive, objective use of feedback; and 4) techniques of managing conflict and confrontation during team meetings. One other questionnaire item in this professional practice theme produced shared levels of agreement; this item identified the elements of effective teams (e.g., joint goal setting) under the theme component titled the "mechanics" of team interaction.

PROFESSIONAL PRACTICE THEME III—TEAM FUNCTIONS

The third professional practice theme generated nine items that were rated by 80% or more of the respondents in both groups as essential elements of effective teamwork. The first theme component (the types and order of assessment practices) included two items that met this criterion: 1) the use of team assessment data as the foundation for collaborative problem solving to develop a profile of student strengths and needs; and 2) the necessary commitment of team members to ongoing assessment, including observation across a range of environments.

The theme component *IEP Development* produced high agreement on four items: 1) the use of a collaborative process in IEP development that begins with assessment data from which common goals are identified; 2) that IEPs consist of a single set of integrated methods contributed by members of multiple disciplines; 3) the use of a decision-making process to select intervention methods; and 4) the combination of intervention methods from multiple disciplines to promote acquisition of functional skills in a range of contexts.

The theme component *IEP implementation* produced agreement across both groups regarding two essential elements of the teamwork knowledge base: 1) intervention plans are created by all member of the team working in

collaboration with one another; and 2) a decision-making process is used to determine when, and by whom, the intervention plan is to be implemented.

The final component in this professional practice theme was *IEP evaluation*. Only one questionnaire item generated shared agreement: that brainstorming in the context of a problem solving process be used to select alternative interventions when initial attempts have proven unsuccessful.

SHARED AGREEMENT ACROSS BOTH GROUPS AS TO NON-ESSENTIAL ELEMENTS IN THE TEAMWORK KNOWLEDGE BASE

The criterion for determining shared agreement as to *non-essential* elements of the knowledge base was 50% or fewer members of both groups agreeing on the importance of an element of effective teamwork. Data on only three of the 82 questionnaire items met this criterion. All three items were found in the second professional practice theme—team structures. Two of the three items were in the theme component *The concept of stages of professional development and the relationship of those stages to change and innovation*. Specifically, an item that addressed the use of situational leadership to respond appropriately to fellow team members who are experiencing change and innovation was favored by only 38% of the related service providers and 47% of the special educators. The possibility that periods of change and innovation may be associated with increased vulnerability was favored by 21% of the related service providers and 41% of the special educators.

In the subsequent theme component *Interpersonal communication*, effective nonverbal communication was viewed as essential by only 41% of the related service providers and 35% of the special educators. A summary of these three items is found in Table 4.

DISAGREEMENT BETWEEN THE TWO GROUPS AS TO ESSENTIAL ELEMENTS IN THE TEAMWORK KNOWLEDGE BASE

This analysis was done to identify those items that produced substantive disagreement between the two groups regarding their relative importance for the teamwork knowledge base. The criterion established for identification of these teamwork elements was a difference equal to or greater than 20% between the two groups. A total of 17 questionnaire items produced this degree of difference; a summary of these teamwork elements is found in Table

TABLE 4
Items With Agreement Across Both Groups Regarding the Non-Essential Nature of the Teamwork Elements

Title of Theme Component	Topic of Questionnaire Item	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Judged the Item to Have Value for Team Members
The concept of "stages" of professional development; the relationship of these stages to change and innovation	Use of situational leadership to respond appropriately to fellow team members who are experiencing change or innovation	38%	47%
	The possibility of increased vulnerability during change and innovation	21%	41%
Interpersonal communication	Examples of effective non-verbal communication methods	41%	35%

5. Again, the results specific to each professional practice theme, and related theme components, are reported in the same order as organization of the questionnaire.

PROFESSIONAL PRACTICE THEME I—THE PHILOSOPHY OF COLLABORATIVE TEAMWORK

One item in the third theme component, *Legal justification for related services*, produced criterion level disagreement. The outcome of the Rowley Case was viewed as important by 66% of the related service providers but 88% of the

TABLE 5
Disagreement Between the Two Groups of At Least 20% Regarding the Essential Nature of the Teamwork Elements

Title of Theme Component	Topic of Questionnaire Item	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Judged the Item to Have Value for Team Members
Legal justification for the provision of related services	Outcome of the Rowley Case re. the provision of related services	66%	88%
Resolving differences in team philosophy	Higher program quality results from collaborative teamwork when compared with teams whose members work in isolation	90%	65%
The concept of "stages" of professional development; the relationship of these stages to change and innovation	The stages of professional development (e.g. renewal)	17%	53%
	Impact of change or innovation may require adjustment in the stages of professional development	24%	59%
	The stages of concern about innovation	17%	71%
	Levels of use of an innovation (e.g., introduction, routine use)	14%	53%
	Rationale for, and techniques to maintain self-concept and positive attitudes during change or innovation	52%	82%

TABLE 5.
Continued

Title of Theme Component	Topic of Questionnaire Item	Percentage of Related Service Providers Who Rated the Item as Having Value for Team Members	Percentage of Special Educators Who Judged the Item to Have Value for Team Members
	The possibility of increased vulnerability during change and innovation	21%	41%
Interpersonal communication	Definition of interpersonal communication	52%	76%
	Giving "credit" to fellow team members	45%	65%
	Conflict/confrontation management within the school organization	72%	94%
Determining the form(s) of role expansion	Stages of the collaborative consultation process	93%	71%
	Guidelines for use of interpersonal skills during the collaborative consultation process	38%	59%
	Levels of readiness to enter a consultative relationship	55%	76%
The "mechanics" of team interaction	The importance of rotating the role of team leader during team meetings	59%	88%
	The importance of rotating the role of recorder during team meetings	45%	94%
	Typical leadership styles (e.g., "selling," delegating)	66%	94%

special educators. In the subsequent theme component, *Resolving differences in team philosophy*, 90% of related service providers but only 65% of special educators supported the questionnaire item that stated "higher program quality results from teamwork characterized by collaboration, when compared with teams whose members work in isolation from one another."

Professional Practice Theme II—Team Structures

This professional practice theme generated a large number of questionnaire items characterized by disagreement between members of both groups. This was particularly true for items in the first theme component *Stages of professional development and the relationship of those stages to change and innovation*. Responses on six of the seven items in this component met the criterion of difference between the two groups. This trend began with the first questionnaire item in this theme component which described the stages of professional development. This teamwork element was viewed as essential by 17% of the related service providers and 53% of the special educators. The same trend was seen in five more items within this theme component; in all cases a higher percentage of special educators agreed that the questionnaire items described essential teamwork elements than their colleagues who were related service providers. These items were: 1) the impact of change and innovation on adjustment in the stages of professional development; 2) the stages of concern about innovation; 3) levels of use of an innovation; 4) techniques to maintain a positive attitude during change and innovation; and 5) the possibility for increased physical vulnerability during change and innovation.

The second theme component in this section, *Interpersonal Communication*, also produced variable levels of agreement across the two groups. The definition of interpersonal communication was valued by only 52% of the related service providers but 76% of the special educators. Giving "credit" to fellow team members as a form of feedback was valued by 45% of the related service providers and 65% of the special educators. Finally, management of conflict and confrontation within the school organization was viewed as essential by only 62% of the related service providers compared to 94% of the special educators.

The presence of criterion level differences between the groups continued to persist throughout this professional practice theme. The same trend was evident in the subsequent theme component *Determining the forms of role transition*. This section contained questionnaire items on two different topics, four items on role transition and seven items on collaborative consultation. None of the items on role transition generated criterion level differences. Three of the seven items that addressed the practice of collabo-

rative consultation did, however. A definition of the stages of the consultation process was seen as essential by 93% of the related service providers, but only 71% of the special educators. This trend was then reversed on two items in this theme component with special educators viewing "guidelines for interpersonal skills during consultation" as more important than the related service providers (59% to 38%); and 76% of special educators but only 55% of the related service providers expressing value for "knowledge of the readiness to enter a consultative relationship."

The last theme component on which criterion level differences were seen was *The "mechanics" of team interaction*. There were only five items in this theme component but three of the five were viewed differently by the two groups. In all three items, the special educators agreed with the essential nature of the teamwork elements more so than the related service providers. These differences were seen on the importance of rotating the role of "leader" during team meetings (88% to 59%), as well as the role of recorder (94% to 45%). This same trend was seen on the questionnaire item that identified typical leadership styles that may arise in team meetings (94% to 66%).

No differences equal to or greater than 20% were seen on any items in the third and final professional practice theme—team functions.

DISCUSSION

Interpretations of Data in Support of a Shared Understanding of Teamwork

Analysis of the percentage of shared agreement revealed four consistent themes regarding which elements of the teamwork knowledge base were viewed as essential, as well as which elements were rated as non-essential, by both groups.

The first theme is the consistent support for knowledge and skill in the area of problem solving. Support for problem solving was seen across all three professional practice themes beginning in Professional Practice Theme I—The philosophy of collaborative teamwork. Specifically, members of both groups embraced knowledge of the opportunity to engage in joint problem solving as one benefit of transdisciplinary service delivery. Support for problem-solving continued into Professional Practice Theme II—Team structures, as the interpersonal skills necessary to participate in problem-solving were one of the few skills in the theme component *Interpersonal Communication* rated as essential by over 80% of the members of both groups.

Problem solving was supported as well in Professional Practice Theme III. Both groups rated the use of assessment data as the foundation for problem solving during development of a student profile to be an essential element of effective teamwork. The use of brainstorming within a problem solving framework to generate alternative interventions for those proven unsuccessful also generated high levels of support.

An interpretation of the data in support of problem solving is found in the work of Villa and Thousand (1994) who stated:

> Collaborating adults are able to generate new conceptualizations and novel solutions to the daily challenges presented by a diverse student population through the synergistic processes of *collective induction* (i.e., inducing general principles together that no one could induce individually) and *process gain* (i.e., generating new ideas through group interaction that are not generated when people work alone). (p. 81)

The widespread support for problem solving across all three professional practice themes reveals an apparent recognition on the part of these respondents as to the value of these synergistic processes.

Although there was a strong expression of support for problem solving at both the levels of philosophy and practice, other trends in these data suggest that the majority of these respondents adopted a posture described by Johnson and Pugach (1996) as "individualistic." An individualistic posture may be inferred from the reluctance expressed by these veteran team members to embrace the full range of interpersonal communication skills (e.g., giving and accepting positive feedback, validating the perceptions of others, active listening, etc.) articulated in Professional Practice Theme II. Overall, those teamwork skills that guide people to engage in adult-adult interaction were supported to only a limited degree by these respondents. Regrettably, an individualistic posture may limit how expertise is utilized to the fullest extent, particularly if the primary processes that create the structure for team interaction is an individual, case-by-case, problem solving approach. Although the literature suggests that an individualistic posture may be potentially problematic for many teams, the degree to which these team members embraced the full range *team functions* described in the final professional practice theme suggests that their ambivalence about interpersonal skill development may not have diminished their ability to carry out these functions well.

The second theme in the data that may suggest a shared understanding of essential elements of the teamwork knowledge base was the willingness of both groups to share and combine intervention methods from their respec-

tive disciplinary frameworks. Again, support for this theme was seen at the level of philosophy and in practice. Items that described the necessity for a single IEP document to be developed that reflects methods drawn from multiple disciplines were supported across a range of questionnaire sections.

The third theme in support of a shared understanding of effective teamwork is the importance of assessment data expressed by these respondents. Support for this theme was seen in more than one theme component, including the use of assessment as the focus of collaborative problem solving in determining a profile of student strengths and needs and a commitment to ongoing assessment processes including observation across environments.

The fourth and final theme reflecting shared understanding across both groups was decision-making. Support for this teamwork element was seen in Professional Practice Themes II and III. An item describing the interpersonal skills necessary for participation in decision-making was supported by both groups, as was the recognition of decision-making as a necessary process to select intervention methods. Finally, decision-making as the means for determining when, and by whom interventions will be implemented was highly favored by both groups as well.

Another subset of these data support the concept of shared understanding across disciplines although the trend in the data differs from those described above. This trend was seen in those questionnaire items that were rated as essential by *fewer* than 50% of the members of both groups. This small number of items (n = 3) were all found in Professional Practice Theme II—Team Structures. An item describing the use of situational leadership to respond appropriately to fellow team members who are undergoing change and innovation was rejected, as were two other items found in the subsequent theme component *Interpersonal Communication*. These latter items addressed the "possibility of increased vulnerability during change and innovation," and "elements of effective non-verbal communication."

INTERPRETATIONS OF DATA THAT REVEAL DIFFERENT UNDERSTANDINGS OF TEAMWORK

The data that revealed *differences* between members of both groups are limited to the first two professional practice themes. Some interpretations of these data are discussed for each of these Professional Practice Themes in sequence.

PROFESSIONAL PRACTICE THEME I

Two items in this professional practice theme generated substantive differences between the two groups. A questionnaire item on the Rowley Case, which addressed the concept of "educational benefit" from service provision, was viewed differently by members of the two groups. It is possible that this legal decision, because it did not impact the practice of occupational or physical therapy, nor speech-language pathology, may have been viewed as irrelevant to these related service providers.

The second item that generated differences, however, addressed the belief that higher program quality results from collaborative teamwork. Interpretation of the result on this item may be more problematic. A full 90% of the related service providers rated as essential the belief that collaborative teamwork results in higher program quality as compared to 65% of the special educators. This difference is somewhat puzzling, especially given the high levels of support that other items related to the benefits of the transdisciplinary team enjoyed from the special educators who comprised this group. For example, a number of the hallmarks of collaborative teamwork articulated in the questionnaire were rated "essential" by these special educators including items regarding a shared philosophy about teamwork, a shared belief regarding the responsibility for sharing and combining methods, and the focus on the "whole child" that is facilitated when team approaches to assessment are used. Clearly, these other data sources drawn from the questionnaire reveal the high regard these special educators expressed for key elements of collaborative teamwork.

An interpretation for the *differences* in viewpoints of program quality is that related service providers who work in educational settings have already made a choice to work outside of the medical or clinical settings that dominate the professional identity of many of their colleagues. This choice may reflect their explicit embrace of the concept of transdisciplinary service provision. Conversely, the special educators were prepared specifically for the educational settings in which they found themselves. It is possible they had not made the same degree of choice in selecting which form of service provision they would provide, and did not recognize all of the advantages that result from the transdisciplinary team model.

PROFESSIONAL PRACTICE THEME II

The section of the questionnaire that produced the most dramatic data in terms of differences between the groups is the first theme component within Professional Practice Theme II—Team Structures. This theme component, *The stages of professional development and the relationship of these stages to change*

and innovation, consisted of seven items. Differences between the two groups equal to or greater than 20% were seen on six of the seven items. Although the overall support for this theme component was lower than most other sections of the questionnaire, the special educators rated all of these items much higher than the related service providers.

The perception of impact from change and innovation may differ across groups of school professionals who serve within the same educational settings for a variety of reasons. One interpretation of these data is related to the itinerant roles fulfilled by the related service providers compared to the special educators who served these children and their families on a daily basis. The special educators may have been more aware of the public scrutiny of educational practice whereas the related service providers may have been less aware of the day-to-day challenges inherent in service provision for children with low incidence disabilities.

A second possible interpretation of these data lies in the length of time that had passed since formal preparation of many of the related service providers. These respondents had practiced their respective professional roles for an average of 14 years; only one related service provider had less than seven years of experience. It may be that their pre-service programs had failed to address issues of change and innovation; an expectation addressed more explicitly in current preparation programs. These data suggest, however, that all professionals who serve in the dynamic arena of contemporary educational settings be prepared for the impact of change on their personal and professional lives.

It is also suggested that professionals who serve as team members in educational settings be able to respond to public demands for change in a thoughtful fashion. Clearly, these team members, with their broad support for problem solving, have their practice grounded in a skill that is a large part of the change process in educational settings (Patterson, 1993). Their support for the process of decision-making may be interpreted in a parallel fashion as this skill is also invaluable in those settings where school professionals experience change and innovation. Clearly, these veteran service providers supported the importance of a repertoire of broad based skills useful in the change process.

In addition to the differences in the first theme component of this Professional Practice Theme, there were differences as well within the theme component *Interpersonal Communication*. This was seen in the presence of the three items that were viewed as non-essential by members of both groups in this section, as well as many of those items that were viewed differently by both groups. An interpretation for these data may be drawn from the field of

cooperative learning (Johnson & Johnson, 1987, 1994). One of the characteristics of cooperation is small group skills in communication and conflict management. Although some support for conflict management was seen in these data, the support for communication development was less clear. Only 21% of the items in the theme component *Interpersonal Communication* reflected shared understanding across both groups.

Differences between the two groups were also seen in those items devoted to collaborative consultation in the subsequent theme component. A high level of agreement was expressed by related service providers for knowing the *stages* of the consultation process as compared to special educators. Conversely, all of the items that addressed interpersonal aspects of consultation (e.g., guidelines for interpersonal skills during the consultation process, levels of readiness to enter a consultative relationship, assessment of the willingness to enter a consultative relationship) were rated higher by the special educators. It may be that the special educators were most often the consultee in the consultative relationship making them more sensitive to the interpersonal aspects of this process.

The final theme component that revealed substantive differences between the two groups was The *"mechanics" of team interaction*. Three of the five teamwork elements were viewed differently by the two groups including rotation of roles in team meetings (leader and recorder) and typical leadership styles. For the most part, the special educators were the team leaders in these settings and related service providers attended only those team meetings that addressed the needs of the students they served. For this reason, many of these related service providers may have been reluctant to accept rotation through a primary role, or to appreciate the importance of leadership styles. Their itinerant status in these settings may have contributed to these differences in important ways.

CONCLUSIONS

These data are instructive for a number of reasons. These veteran team members expressed overall support for multiple dimensions of teamwork, including the willingness to share and combine methods, engage in problem solving, and participate in a process that permits team members to determine when, and by whom, instructional programs are implemented. They also expressed high levels of shared agreement for the activities, or functions, of their teams as articulated in the third Professional Practice Theme. Although there was inconsistency in the support for interpersonal communication skills, as well as some other aspects of team structure (e.g., the stages of pro-

fessional development), ultimately it is the *actions* of the team's members, beginning with assessment and continuing through IEP development, implementation, and evaluation, that are essential to effective teamwork. In their support of team functions, carried out to a large degree with support of best practices in transdisciplinary service provision, these team members fulfilled the policy statements of the professional organizations that represent their disciplines (e.g., APTA, AOTA).

It is hoped that these data, a preliminary source in identification of shared understanding of teamwork across disciplinary boundaries, may help guide the design of pre-service and in-service preparation for special educators and related service providers. It is hoped as well that these data, and the various interpretations provided, will contribute to the ongoing dialogue regarding *how* to meet the challenge of effective teamwork in contemporary educational settings.

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REVIEW OF INTRATHECAL BACLOFEN THERAPY FOR SPASTIC AND RIGIDITY DISORDERS

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ABSTRACT

Intrathecal baclofen therapy, a treatment for cerebral palsy and other spastic and rigidity disorders, is showing promise as an effective intervention. This article synthesizes both the medical and rehabilitation conceptual literature to update educators and related service providers as to the efficacy of this intervention. Implications for teachers and therapists of students with physical disabilities are put forth.

Cerebral palsy refers to "a group of conditions that affect muscle movement and control or coordination" (Bowe, 2000, p. 107). Of the three major types of cerebral palsy, spasticity is by far the most common, comprising 60% of the affected population (Albright, Barron, Fasick, Polinko, & Janosky, 1993). The essential features of spastic cerebral palsy, also called hypertonia, include stiff, difficult, and uncoordinated movements resulting in possible contractures (Meythaler, Guin-Renfroe, & Hadley, 1999).

Recently, two articles in this journal have reviewed literature concerning treatment and management of individuals with spastic cerebral palsy. These articles addressed for educators and related service providers two of the more promising treatment protocols for the management of spastic cerebral palsy, Botox and Selective Dorsal Rhizotomy (SDR). Technically, there is a trilogy of management options used in most clinics today. The third option is Intrathecal Baclofen (ITB) therapy.

A sizeable number of students with spasticity are receiving ITB therapy at specific centers throughout the country, as the intervention is now in the final stages of investigation and refinement. The purpose of this article is to review the conceptual literature on ITB therapy and synthesize it for special education teachers and related service providers. Additionally, this review will compare ITB therapy to other current treatments for spasticity.

Baclofen, with a trade name of Lioresal, was developed by Novartis Pharmaceuticals and is supplied nationally by Ciba-Geigy (Meythaler, Steers, Tuel, Cross, & Haworth, 1992). It is a highly effective antispasmodic drug which works by blocking the release of neurotransmitters from nerve endings within the spinal cord (Albright, Barry, Painter, & Shulz, 1998; Coffey et al., 1993). It was originally developed solely for oral use and is currently used to treat slight spasticity and other conditions involving muscle spasms. Oral baclofen is produced in 10 mg and 20 mg tablets (Medical Economics Company, 1998). Because oral baclofen crosses the blood-brain barrier poorly, it reaches relatively low concentrations in the spinal fluid. Therefore, the dosages needed for moderate and severe spasticity make oral use an unacceptable option for many individuals (Gormley, 1999; Meythaler, 1997).

An alternative to oral use, the continuous infusion pump-intraspinal catheter system (ITB therapy), is a device for delivering baclofen directly into the cerebral spinal fluid. The tubing or catheter is placed into the lumbar subarachnoid space, allowing the baclofen to be delivered directly to the spinal nerves (Meythaler, McCary, & Hadley, 1997). The pump itself is an inch thick and three inches in diameter (Albright, 1996). It is implanted in the lower right abdomen. Two incisions are made, one for the pump and one for the catheter. The procedure is performed under general anesthesia (Meythaler et al., 1999).

The pump has been approved by the US Food and Drug Administration since June, 1996 (Albright, 1996). There are currently two major manufacturers of implantable pumps suitable for ITB therapy. "At the present time, the SynchroMed pump (Medtronic, Minneapolis, MN) is the only commercially available implantable pump whose rate of infusion can be externally adjusted" (Albright, 1996, p. S32). The pump has a number of advantages over surgical procedures (e.g. SDR). The adjustability of muscle tone reduction is a primary benefit. As the half-life of baclofen is 4 hours, the pump can be adjusted to as many as 10 intervals per day for peak functioning during regularly scheduled activities of daily living (Gilmartin et al., 2000). As noted by Meythaler (1997), "a programmable delivery system for intrathecal baclofen allows the physician to customize dosage for the individual needs of the patient without irreversible consequences" (p. 90). The reservoir supply-

ing the pump must be refilled at a maximum of 90 days (Meythaler et al., 1999). The pump is battery operated with a longevity of 4 to 5 years (Albright, 1996). The reduction of spasticity is typically observable within two hours after administration of baclofen (Albright et al., 1998). The dosage for long-term continuous infusion ranges from 300 mcg. to 800 mcg. per day (Medical Economics Company, 1998). The lowest dose with optimal response is the treatment goal.

ADVERSE EFFECTS

The complication rate for ITB therapy is substantially higher than a surgical alternative. For SDR the complication rate is less than 1% compared to 20% for ITB therapy (Gormley, 1999). Of the 51 patients enrolled in a recent clinical trial, 41 reported one or more adverse events (Gilmartin et al., 2000). The most common adverse events included: hypertonia, seizures, somnolence, headache, nausea, vomiting, dizziness, increased salivation, and constipation. More serious complications included: meningitis, cellulitis, and catheter malfunction (Gormley, 1999). Sudden withdrawal of baclofen can lead to hallucinations and seizures (Meythaler, 1997). Individuals with obsessive compulsive disorder have been reported to experience difficulty with ITB therapy by constantly manipulating their ITB pump soon after placement. This phenomenon has been labeled twiddler's syndrome (Meythaler et al., 1997). In almost all cases, individuals who have experienced adverse effects have continued with the therapy.

RESEARCH/LITERATURE RESULTS

The following are recent findings for the use of ITB therapy with individuals who have spastic and rigidity disorders:

- Meythaler et al.(1992) examined the impact of ITB therapy on individuals with spinal cord spasticity. While the investigators reported an average drop of 2.3 points (from a score of 4.3 to 2.0) on the Modified Ashworth scale (a numeric 1–5 scale that is a clinical measure of spasticity), all individuals required in-patient physical therapy and a 10-day hospital stay. It was further noted that the dosages required to control spasticity significantly increased, almost doubling, within the first year. The researchers speculated that the nervous system builds up a tolerance to baclofen over time.

- Coffey et al. (1993) in a randomized double-blind study found a reduction of spasticity on the Ashworth scale (a numeric 1–4 scale that is a clinical measure of spasticity) of 2.2 points (from a score of 3.9 to 1.7) and a reduction in muscle spasms of 2.1 points (from a score of 3.1 to 1.0). The researchers further found that the dosage of baclofen required to maintain a therapeutic effect increased over time. However, by using a drug holiday of two to four weeks for selected patients, drug tolerance was a manageable phenomenon.
- Albright et al. (1993) treated 37 patients with cerebral palsy with ITB therapy. The experimental intervention indicated the following: (1) muscle tone was significantly decreased in upper and lower extremities, (2) range of motion was appreciably increased in knee extensions, (3) overall upper extremity function was significantly increased, and (4) activities of daily living were substantially improved. The study further indicated no significant improvement in ankle dorsiflexion, hip abduction, and/or position transitions.
- Albright, Barry, Fasick, and Janosky (1995) reported a clinical study comparing 38 pairs of children who had spastic cerebral palsy. The study involved a comparison of upper extremity spasticity at 6 and 12 months after treatment with either ITB therapy or SDR. ITB Therapy 5 Results indicated the following: (1) both treatments were effective in addressing upper extremity spasticity, (2) ITB therapy was probably the treatment of choice for those ambulatory patients who did not have enough strength to walk without support from spasticity (sufficient and necessary muscle tension), and (3) SDR was probably the treatment of choice for those ambulatory patients who had sufficient strength in their lower extremities.
- Steinbok, Daneshvar, Evans, and Kestle (1995) performed a cost analysis on both ITB therapy and SDR in the treatment of two matched groups of children (n = 9, n = 10) with spastic cerebral palsy. The researchers noted that both ITB therapy and SDR were effective in treating the spasticity associated with cerebral palsy. The analysis conducted with the Canadian dollar indicated the following after one year of treatment: (1) ITB therapy averaged $64,163 per patient, and (2) SDR averaged $16,913 per patient. The researchers further noted that the drug required for ITB therapy would necessitate an ongoing expenditure of approximately $2,000 per year. In addition, a relatively high rate of complications were found in the group that received ITB therapy while no complications were found in the group who received SDR.

- In a counterpoint to the Steinbok et al. (1995) study, Albright (1996) questioned the relevance of a cost comparison between ITB therapy and SDR as these two treatments are indicated for children with different types and etiologies of spasticity. He reported a study which indicated that the ITB therapy was cost effective when considering the high cost of later orthopedic surgery (i.e. to deal with contractures) and long-term physical therapy.
- Albright (1996) also reported that ITB therapy is most appropriate for four distinct groups of individuals with spasticity: (1) children who are ambulatory with poor underlying strength, (2) children who are 16 years of age or older, (3) children who are nonambulatory due to quadriplegia and whose spasticity limits their comfort and endurance, and (4) children who have such severe spasticity that it is difficult for a single caregiver to perform personal hygiene and other basic care.
- In a double blind, randomized, multicenter study of 22 patients over a one year period, Middel et al. (1997) examined the use of ITB therapy for persons who did not respond to oral medication including oral baclofen. The researchers reported that the use of ITB therapy resulted in significant improvement in sleep, mobility, body care, recreation, and generalized movement. However, no change was seen in two measures of psychosocial behavior.
- Meythaler et al. (1997) reported that ITB therapy often resulted in an increase in functional strength due to the reduction of abnormal motor tone. In addition, the investigators strongly suggested avoiding irreversible procedures in the treatment of spasticity.
- In a longitudinal study, Rawicki (1999) found that 17/18 patients benefitted from ITB therapy. Results included a reduction in tone which reduced the need for nursing care and/or improved overall function. On the Modified Ashworth scale, the mean reduction in all patients was two full points (from a score of 5.0 to 3.0).
- Gilmartin et al. (2000) described a protocol to predict the efficacy of ITB therapy by a fairly simple procedure. This procedure identifies appropriate candidates for ITB therapy prior to a much more invasive intervention, surgical implantation of a pump. In a 12-center clinical trial using randomized, double-blind procedures, the researchers identified 51 possible candidates for ITB therapy by injecting 50 mcg., 75 mcg., or, in rare cases, 100 mcg. of baclofen using a standard lumbar puncture. The Ashworth scale was administered before and after the trial injections to document an appropriate reduction in spasticity.

- Stempien and Tsai (2000) surveyed 115 centers who utilized ITB therapy in their treatment of persons with spasticity. They stated that over 90% of center directors reported significant improvements in orthotic wear, sitting tolerance, ambulation endurance, and limb contractures. Other major findings were noted: (1) pump accuracy is decreased as the reservoir approaches the empty point and (2) ITB therapy is not risk free as approximately 10% of treatments required re-operation. Baclofen infusion team members generally include a diverse group of specialists including neurosurgeon, physiatrist, physical therapist, occupational therapist, and speech therapist,
- Van Schaeybroeck et al. (2000) in a double-blind study of 11 individuals with spastic cerebral palsy reached two major conclusions about ITB therapy: (1) swallowing and speech were somewhat improved and (2) individuals with hemiplegia may respond positively without unwanted side effects in their unaffected limbs.

IMPLICATIONS

Special education teachers and related service providers need to be apprised when a student begins ITB therapy. The following modifications or changes must be considered:

Orthotic wear—Because students very well may have reduced spasticity, they may need to be fitted with different, less restrictive orthotic wear;

Physical and occupational therapy—Because physical, and possibly occupational, therapy are needed following ITB therapy, a change in the IEP may well be needed;

Seating and posturing—Some students may be able to sit in a better position with better posture. Classroom seating may need to be modified to accommodate the changes in muscle tone;

Adaptive devices—Some students returning to the classroom may be able to better use accommodative switches, adaptive keyboards, and more sophisticated communication systems due to less spasticity. A new trial of adaptive devices is recommended;

Medication changes—Because some students develop a tolerance for baclofen, the programmable dose may well need to be increased. The special education teacher is in an excellent position to observe changes in muscle tone and alert the parents and physician; and

Consultation—ITB therapy incorporates a programmable pump which may be customized to individual needs. The pump has the ability to change doses of medication up to ten times per day., teachers and therapists may need to establish a firm schedule when specific activities are performed. The pump then can be programmed in anticipation of these daily events (i.e. physical therapy, eating lunch, writing, toileting).

SUMMARY

Returning to the trilogy theme previously mentioned, Albright's (1996) examination of the 100 most recently seen children in the Spasticity Clinic at the Children's Hospital of Pittsburgh, revealed a hierarchy of treatment procedures. The three most common interventions were (1) SDR (n = 30), (2) ITB therapy (n = 21), and (3) Botox (n = 12). This clearly illustrates the importance of ITB therapy and its relative relationship to the interventions examined in this journal previously.

In conclusion, students with cerebral palsy and other disorders causing spasticity now have treatment choices not readily available even twenty-five years ago. Medical practitioners now have options to improve physical function, relieve constant pain or discomfort resulting from spasticity, prevent secondary disorders such as contractures, and add to the quality of life for individuals with spasticity and their caregivers. Like other treatment options previously discussed in this journal, ITB therapy is not a panacea nor does it change the underlying disorder. It is, however, an important treatment tool.

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A TEACHER'S GUIDE TO INCLUDING STUDENTS WITH DISABILITIES IN GENERAL PHYSICAL EDUCATION (SECOND EDITION)

Martin E. Block
Paul H. Brookes Publishing Co., 2000
$44.95, 416 pages
ISBN 1-55766-463-3

REVIEW

In the second edition of his book, *A Teacher's Guide to Including Students with Disabilities in General Physical Education*, Martin Block provides both updated and new information on the inclusion of students with disabilities in physical education. As Block wrote in the book's preface, "The most noticeable change in the second edition is the use of the word *general* rather than *regular* in the book's title, in recognition of the negative effects of labeling and stigmatization that once resulted when students were separated into 'regular' and 'special' education classes. Today the trend is toward including students in typical, general classrooms with the supports and accommodations they need." This book definitely provides excellent, practical information on the supports necessary for inclusion in physical education with a particular emphasis on instructional, curricular, and game modifications.

The first two chapters provide definitions of quality physical education programs and of inclusion. As a special educator, I found the first chapter describing physical education to be quite informative. The continued references to the Individuals with Disabilities Education Act (IDEA) Amendments of 1997 (PL105-17) are instructive to anyone working to provide physical education to students with disabilities within the mandates of IDEA. The second chapter, although historically accurate, presents a limited description of inclusion. I would recommend that the reader turn to any number of general resources for a broader review of inclusive education. However, this chapter does provide information on inclusion as posited by the major physical education professional organizations.

Chapters 3, 4, and 5 describe excellent strategies for using a team approach to implement inclusive physical education and for planning and assessment for inclusion. Teachers, therapists, parents or other advocates, and

administrators can refer to these chapters for timelines, checklists, lesson and unit plan examples, activity descriptions, IEP goal and objective examples, and specific assessment descriptions and forms. The information on pages 114–170 on assessment is exceptional as Block takes the reader step by step through implementing ecological assessment and person-centered planning procedures, writing IEP goals, and using a variety of procedures for determining skill levels, modifications/accommodations, and supports. The user-friendly forms in these three chapters are among the best I have seen in the literature on inclusion.

The second half of this book, Chapters 6 through 12, is significantly different from the first edition. Chapters 6, 7, and 8 provide expanded information and examples on implementing instructional, curricular, and game modifications so that students with any type of disability can participate in general physical education. The last four chapters, 9–12, are new and are based, according to Block, on feedback from physical education professionals. While the last chapters in the first edition concentrated on inclusive physical education at different grade or age levels, the second edition has switched its emphasis to social acceptance, safety, behavior management and aquatics.

Like Chapters 3, 4, and 5, Chapters 6–8 are full of illustrations, checklists, examples, lists, and forms. All these materials relate to determining and implementing modifications or accommodations. Particularly useful are descriptions of how supports can be provided to students with specific disabilities (Chapter 7) and lists of accommodations for a variety of team and individual sports (Chapter 8).

Concerning the new chapters in this edition, Chapter 9 details practical methods for teaching ability awareness to students without disabilities. Chapter 10 includes guidelines, checklists, and forms that help ensure safe learning environments. I found these two chapters to contain material adaptable to any education or recreation situation where children, youth, and young adults with and without disabilities participate.

Although Chapter 11 does provide explanations and examples of several useful behavioral intervention techniques, many educators would consider this philosophy of "behavior management" somewhat outdated. A more useful approach for inclusive educational settings would be "positive behavior support." This new approach to behavioral intervention is based on functional assessment procedures as mandated by the 1997 IDEA Amendments and emphasizes redesign of the environment. The reader should augment some of the approaches in Chapter 11 by referring to the wealth of materials now available on positive behavior support.

The final chapter, 12, is an excellent guide for including students with disabilities in aquatic programs. The material here is useful for any school or community facility providing aquatics. Following Chapter 12 is a comprehensive *Resource* section containing addresses and websites for adaptive equipment, disability groups, professional association, and sports and recreation organizations for people with disabilities.

As Claudine Sherrill pointed out in the Foreword to the first edition, Martin Block was the first physical educator to develop a textbook specifically devoted to inclusion. His second edition remains the only comprehensive guide on this topic. For this reason alone, the book is a must for professionals implementing inclusive physical education. However, the importance of this resource ultimately lies in its practicality and usefulness as a true "hands-on" guide for not only the physical, general, or special educator but for anyone involved in inclusive school and community programs.

Reviewed by
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MEETING PHYSICAL AND HEALTH NEEDS OF CHILDREN WITH DISABILITIES: TEACHING STUDENT PARTICIPATION AND MANAGEMENT

Kathryn Wolff Heller, Paula E. Forney, Paul A. Alberto,
Morton N. Schwartzman, Trudy M. Goeckel
Wadsworth/Thomson Learning, 2000
428 pages, $87.95
ISBN: 0543-34837-8

REVIEW

Meeting Physical and Health Needs of Children with Disabilities provides information on physical management skills and specialized health care procedures for students with disabilities. The authors' backgrounds include education, medicine, nursing, physical therapy, occupational therapy, parent of a child with a severe health impairment, and grandparent of a child with a severe physical disability. The book contains specific strategies for physical management issues and step-by-step instructions for health care procedures.

The book is organized into four main sections: (a) Instructional and Health Issues, (b) Physical and Management Skills, (c) Basic Self-Help Skills and Related Health Procedures, and (d) Instruction in Respiratory Procedures. The first section contains four chapters that are the framework for the rest of the text. Chapter one provides clear definitions of health problems and discussions of mental, social, and physical health issues involved. General descriptions of equipment and technology, assistive strategies, and instructional strategies are provided for specific health problems discussed in later chapters. Explanations, guidelines, examples, and samples of individualized health plans (IHPs) and individualized educational programs (IEPs) are included. Chapter two provides strategies for assessment and instruction for promoting student participation and independence in the management of health care needs. Chapter three provides a discussion of augmentative communication with specific suggestions for teaching students the needed vocabulary for their specific health needs. Chapter four provides a discussion of medication and guidelines for administration of medication.

Throughout the first section, the authors emphasize the need for a team approach to educating students with health needs and the need for students

to become active participants in meeting their specific health needs. The authors provide guidelines, examples, and sample forms for documentation to assist in the areas of assessment, planning and implementation of health plans and educational programs.

Section two of the book provides content knowledge for physical management skills. Chapter five includes procedures for lifting, carrying, and transferring students from one area to another. Proper handling and positioning are covered in chapter six, and mobility issues are discussed in chapter seven. In each of these chapters, the authors provide information on equipment and technology, assistive strategies, and instructional strategies.

Procedures for self-help skills such as eating, tube feeding, and toileting are addressed in the third section. In addition, chapters eleven and twelve provide a comprehensive discussion of urinary catheterization and urinary collection devices, colostomies, and other ostomies. The authors provide guidelines, examples, and sample forms, as well as information on equipment and technology, assistive strategies, and instructional strategies.

Section four is devoted to instruction in respiratory procedures. The final four chapters include a complete discussion of tracheostomies, managing respiratory secretions, oxygen management, and ventilator management. Step-by-step procedures are provided.

Meeting Physical and Health Needs of Children with Disabilities is a well written, one of a kind, current and comprehensive text that will facilitate assessment, planning, and implementation of IHPs and IEPs for students with physical or health disabilities. The text is a valuable resource for all individuals who will be or are involved in the education of students with health issues. It provides a framework for a collaborative approach necessary for successful health plans and educational programs, and provides educational personnel with content knowledge and specific strategies to teach students to participate in their physical management and health care procedures.

Reviewed by
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WHEN YOUR CHILD HAS A DISABILITY

Mark L. Batchell, Editor
2001, Paul H. Brookes Publishing Co.
$22.95, 498 pages
ISBN: 1-55766-472-2

REVIEW

Batchell et al. have created in this book a very comprehensive resource aimed, by the title, for parents who have children with disabilities. The authors of each chapter are specialists in their own fields; most of them are from the Children's Hospital of Philadelphia and Children's National Medical Centre.

The book is divided into four sections, the first one dealing with how to diagnose disabilities, with some explanation about embryology and child development.

The second section deals with general issues of children with disabilities such as nutrition and feeding, dental care, rehabilitation therapies, different medications, behavioural techniques and identification of rights and benefits.

The third section, which is the bulk of the book, deals with common, more specific conditions leading to developmental disabilities such as Mental Retardation, Down's Syndrome, Genetic Disorders, Perceptual Difficulties, Autism, Attention Deficit Disorder and Learning Disabilities. Finally, at the end there is a very comprehensive list of reading resources and an extensive chapter on genetic counseling.

Even though this is a book that is geared for parents, the style is directed for people who have at least a college education. The chapters, having been written by tertiary care physicians, at times present uncommon conditions as very common given the authors' own specialties.

In each chapter, examples are given of cases, but this can be confusing in that sometimes the examples follow the condition and at other times, the examples are presented before the conditions they represent.

There is a great discrepancy in the style from chapter to chapter with some, such as the one on Spina Bifida being excellent, complete, comprehensive and easy to understand in medical terms and alternatively, the one

on Genetic Disorders is quite complex and would be difficult to understand for most parents.

There is an unbalanced emphasis towards genetic disorders and syndromes in that these conditions cover 49 pages of this over 400 page book, while Cerebral Palsy which is a far more common condition is devoted only 13 pages.

As a whole, this is a very good resource that rather than be directed to parents, should have been addressed for healthcare providers.

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INFORMATION FOR AUTHORS

PHYSICAL DISABILITIES: EDUCATION AND RELATED SERVICES
THE DIVISION FOR PHYSICAL AND HEALTH DISABILITIES

PDERS seeks to publish articles that contribute to the field of knowledge about education and related services for individuals with physical, orthopedic or health impairments. The following are considered for publication: empirical research; theoretical perspectives; case studies which address promising practices; innovative instructional practices; and reviews of relevant books, materials, media and software.

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Manuscripts should be submitted to: Dr. Barbara J. Kulik, 3380 Country Club Drive, Glendale, CA 91208-1718 (bkulik@csun.edu). Three copies of the manuscript, together with a diskette or email attachment of the manuscript in either WordPerfect or MicrosoftWorks in IBM PC-compatible format, should be submitted for review. All tables and figures should be included with each copy of the manuscript.

PREPARATION

The entire manuscript (title page, abstract, text, tables, figures, and references) should be double-spaced on 8 1/2 x 11-inch paper with at least a 1-inch margin on all sides. A cover sheet should include title, author(s) name and affiliation (including statements of credit or research support), address, telephone number and email of the author to whom correspondence should be directed, and a running head. The abstract should precede the text on a separate sheet of paper and should bear the full title of the article. The running head should appear on all subsequent pages.

Tables and figures should be numbered by separate series and placed at the end of the manuscript. Provide brief notes within the text to indicate where each table or figure is to appear.

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