

INVESTIGATING INFLUENCES ON THE CURRENT TRENDS IN
OCCUPATIONAL AND PHYSICAL THERAPY MANAGEMENT OF CLIENTS
EXPERIENCING SPASTICITY

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Submitted to the Department of Education in partial fulfillment
of the requirements for the degree of
Master of Arts in Education

Mount Saint Vincent University
Halifax, Nova Scotia
March 1, 2006

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Your file Votre référence

ISBN: 978-0-494-17517-0

Our file Notre référence

ISBN: 978-0-494-17517-0

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DEDICATION

To my parents who instilled a desire to learn,
to Adam who encourages my educational pursuits,
and to Julia and Isabel who love their mommy no matter what!

ABSTRACT

Clinicians face a diverse array of therapeutic intervention choices while enabling individuals experiencing spasticity in connection with the upper motor neuron syndrome. Currently, it is not known the extent to which particular therapeutic intervention choices are selected by clinicians while enabling the individual, particularly in light of changing medical management for spasticity. Further, given the relative scarcity of relevant research evidence and other literature to guide clinicians in their treatment decisions in this area, it is unclear what factors serve to influence clinicians' treatment decision. This thesis reports results from an extensive mail-out survey of Canadian and American occupational and physical therapists working in neurorehabilitation which was designed and conducted with the aims of illuminating current practice trends, and of inferring if/how individual factors influence the clinician's decision making with regards to spasticity management. Nine hundred Canadian and American occupational and physical therapists who self-identified as working in the area of adult neurorehabilitation were randomly selected for a mail survey, and 494 responses were received and analyzed. The survey gathered information about the individual therapist, therapist education, client demographics, practice environments, and the intervention choices for enabling clients experiencing spasticity. Based on these survey results, this thesis provides a description of the choices clinicians are selecting for spasticity-management with clients in terms of the range of current intervention techniques, the relative frequency of use, and the factors (client and therapist related) that may be influencing these choices. The results of this survey will hopefully provide a clearer picture of the clinical decisions currently being made throughout the continent, and how various client and therapist related factors affect

these decisions, and thereby assist in the future development of best-practice guidelines for the therapeutic management of spasticity.

ACKNOWLEDGEMENT

I would like to acknowledge several people who have contributed in various ways to the completion of this thesis.

My sincerest thanks and appreciation is extended to my thesis advisor Dr. H. Joseph Murphy. Joe's patience, humour and sage advice during the analysis, writing and revision process allowed for an excellent educational experience.

I would like to thank my thesis committee members, Drs. Brenda Beagan and Marilyn MacKay-Lyons for the giving of their time and critical comments. Kerri Chambers deserves acknowledgement for his willingness to share his very helpful population statistical knowledge. Allergan Canada is also acknowledged for providing an educational grant which paid for the costs of the extensive survey mailing procedure.

Last, but certainly not least, I would like to Adam, Julia and Isabel for their steadfast support of this academic pursuit. Thank you to Adam for your patience, advice and willingness to take on the extra duties at home while I tried to balance my full-time work, this academic pursuit and our family. Finally, thank you to my dear children Julia and Isabel for whom I will be forever grateful for their love and support – no matter what!

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Chapter 1 Introduction

There is a lack of literature that clearly and comprehensively guides occupational and physical therapists in the decision-making process for therapeutic intervention with individuals who are experiencing spasticity. Spasticity is but one of the many challenges an individual could encounter during their rehabilitation following an upper motor neuron (UMN) injury. UMN damage causes long lasting neuron damage, and often presents a profile of deficits that are clinically referred to as positive (e.g., spasticity) and negative (e.g., weakness and loss of dexterity) (Lance, 1980; Mayer, Esquenazi, & Childers, 1997). Some of the etiologies where spasticity may be present include stroke, traumatic brain injury, spinal cord injury, multiple sclerosis, and cerebral palsy (Mayer et al., 1997).

The current climate of healthcare reform has led to much emphasis being placed upon the use of “evidence” as a basis for making decisions in planning care, allocating resources and measuring outcomes. The challenge with this term “evidence” is that it has the potential to be interpreted as a synonym for research (Rappolt & Tassone, 2002; Tickle-Degnen & Bedell, 2003), even though it is meant to have a broader definition. Evidence-based practice (EBP) in occupational therapy is defined as the “client-centered enablement of occupation based on client information and a critical review of relevant research, expert consensus and past experience”(CAOT, 1999). When there is a scarcity of relevant research evidence, or what is considered to be acceptable as ‘best evidence’, how exactly do the client experience, practitioner expertise and experience, and practice environment serve to inform or influence the occupational and physical therapist in

clinical decision-making and practice?

This question becomes paramount for therapists working with individuals who have experienced a UMN injury. Given the complexity of the clinical presentation following UMN injury, it is uncertain what specific factors are influencing or contributing to therapists' decision-making processes when considering therapeutic intervention choices, specifically in the area of spasticity management. There is also limited literature describing the range of therapeutic interventions currently employed in practice by occupational and physical therapists for spasticity management in Canada and the United States. Using data from a representative survey of North American therapists, this thesis will examine influences on decision-making, as well as patterns of practice. By attempting to identify the current therapeutic intervention practice together with the influencing factors affecting therapists' decision-making process, it is hoped the relationships identified will lead to a review of training methods for improvement in practice (Mattingly, 1991; Neistadt, 1996).

Occupational and physical therapists engage in the therapeutic interventions process with individuals who have experienced damage to the upper motor neuron (UMN) with the intention of improving the individual's long-term independent function and preventing secondary deformities (Ahrendt, 2001; Albany, 1997; Brin & Group, 1997; O'Dwyer, Ada, & Neilson, 1996). Given that spasticity can affect a person's ability to function, the therapeutic management of the person's spasticity requires clear intervention decisions to improve the client's performance to the best possible level (Mayer et al., 1997). Stroke

alone is currently the leading cause of serious adult long-term disability in both Canada and United States (*Canadian Stroke Network Fact Sheet*, ; *Impact of Stroke*). Recent studies have estimated that at least 28-38% of individuals following a stroke experience spasticity (O'Dwyer et al., 1996; Sommerfeld, Eek, Svensson, Holmqvist, & Von Arbin, 2004; Ward, 2002; Watkins et al., 2002) and that the spasticity affects an individual's recovery and ability to regain independent function (Gillen, 1998; Mayer et al., 1997; McGuire & Harvey, 1999; Richardson, 2002; Ward, 2002). With no comprehensive literature to guide therapists for specific spasticity intervention methods, especially in light of medical pharmacological innovations (Albany, 1997; Ward, 2002), what is currently being done for therapeutic intervention and what is affecting the decision-making process is unknown.

Factors affecting clinical decision-making are multifaceted (Hoffman, Donoghue, & Duffield, 2004). Additionally, the factors contributing to medical management may not be the same as those driving occupational (Fleming, 1991) and physical therapy management decisions. Research with nurses has shown that some of the possible factors that influence clinical decision-making include level of education, experience, knowledge, clinical setting, role and area of practice (Bucknall & Thomas, 1996; Hoffman et al., 2004). It is suspected that some of these factors may also influence occupational and physical therapist decision-making processes in the management of spasticity.

The primary purpose of this research is to describe and examine relationships that exist

between/among what occupational and physical therapists currently identify as therapeutic interventions for spasticity management, a therapist's individual practice profile (including experience, education, setting and location), team or physician relationships, and the other factors that influence their intervention choices with a client with the UMN syndrome and spasticity. By searching for systematic patterns in therapeutic interventions chosen by therapists, as a function of these many potential "influencing factors", those factors (or combination of factors) which stand out in affecting the clinical decisions may be identified. A similar search for patterns in therapists' self-reported priorities for their intervention choices will further assist in illuminating which factors play the largest role in the decision-making process.

Decision-making is not a linear process and as such, the therapist must consider the client, the client's environment, available knowledge, interpersonal relationships, the role of professional expertise and application of available resources (Bucknall, 2003; CAOT, 1999; Hallett, Austin, Caress, & Luker, 2000). It is clear that education, expertise, experience – both the client's and therapist's – and the environment impact the decision-making process both in the presence, or absence, of research evidence. Attentiveness to the many potential influences on the complex nature of intervention planning may provide further understanding into the actual expertise required to complete decision-making to meet the needs of every unique client. It is hoped that this study marks a first step in the direction of understanding the role of education and other factors in the decision-making process for spasticity management.

Chapter 2 Literature Review

An upper motor neuron (UMN) lesion – caused by brain injury, stroke, or a number of other conditions – results in a combination of spasticity and weakness, which in turn causes abnormal joint posturing, rheological changes in the spastic muscle, loss of coordination, and loss of control over velocity of movement (Mayer et al., 1997). All of these changes may affect an individual's ability to regulate voluntary movement and thus to interact effectively with the environment. The end result is that the individual's abilities to complete self-care, to be productive in society, and to engage in leisure occupations may be severely compromised (Boyd, Morris, & Graham, 2001; Gormley, 2001; Shakespeare, Boggild, & Young, 2003, 2004; Taricco, Adone, Pagliacci, & Telaro, 2000).

Occupational and physical therapists engage clients with UMN syndrome in treatment, with the aim of managing both the positive and negative symptoms to enhance the client's functionality. Therapists' efforts are often challenged, however, by the complexity of UMN syndrome. Spasticity is just one of the issues that has the potential to affect multiple aspects of the individual with UMN syndrome. Individual variations in response to UMN lesions and in response to treatment raise further challenges. Therapists are also now faced with the introduction of new management strategies (e.g., general and focal block techniques) to evaluate and consider (Albany, 1997). A further complication is that, depending on their practice setting and location, therapists may have different levels of access to information about these new strategies, as well as varied access to the strategies themselves.

All of these factors – including the lack of generalizable research in spasticity management (see below) – have contributed to the lack of consensus among occupational and physical therapists regarding “best practice” in spasticity management (Inman, 1999; Rice-Oxley & Turner-Stokes, 1999; Shakespeare et al., 2003, 2004). While some guidelines exist, they are generally limited to specific treatments or specific client populations. For example, Ward (2002) provides a “treatment algorithm” for the pharmacological/surgical management of spasticity, but gives no insight into recommended spasticity management approaches for occupational or physical therapists, despite his claim that “devising an algorithm for the treatment of spasticity starts with physical treatments and physical measures . . . Pharmacological intervention is an adjunct to this physical management” (p.52). A general decision-making tree to which therapists can refer when choosing outcome measures and treatment methods for their clients with UMN syndrome remains to be established.

The complexity of UMN syndrome and spasticity management has challenged not only the therapy community, but also the academic and research fields (Inman, 1999; Rice-Oxley & Turner-Stokes, 1999; Scanlan & McGuire, 1998). In Scanlan and McGuire’s (1998) words, “Clinically, spasticity is easy to recognize but can be difficult to quantify and treat. The pathophysiology of spasticity is complex and controversial, which makes research in this area very challenging” (p.1). Indeed, a review of the existing literature using CINAHL, PubMed, and the Cochrane Library has revealed a fragmented evidence base. Spasticity research to date has not examined the whole picture of UMN syndrome

and spasticity management, but rather has focused on isolated pieces of this intriguing puzzle.

The few systematic reviews and meta-analyses that have been published on spasticity management either pertain to a specific medical/surgical treatment (Creedon, Kijkers, & Hinderer, 1997; Groves, Shellenberger, & Davis, 1998; Sampson, Haywood, Evans, Morton, & Collett, 2002), to a specific client population (Boyd et al., 2001), or to a specific medical/surgical treatment for a specific client population (Ade-Hall & Moore, 2000; Boyd & Hays, 2001; Dudgeon et al., 1994; McLaughlin et al., 2002; Paisley, Beard, Hunn, & Wight, 2002; Taricco et al., 2000; van Kuijk, Geurts, Bevaart, & van Limbeek, 2002). The focus of all of these reviews and meta-analyses is on the effectiveness of the specific treatment for the specific population. While some of these studies do go further to suggest guidelines regarding the use of the examined treatment, none discuss the examined treatment in relation to the constellation of other treatment options that must be considered when working with clients with spasticity. Furthermore, the fact is that many of these systematic reviews and meta-analyses conclude that ultimately, existing evidence is inadequate (Ade-Hall & Moore, 2000; Creedon et al., 1997; Paisley et al., 2002; Shakespeare et al., 2003, 2004; Taricco et al., 2000; van Kuijk et al., 2002). For example, Shakespeare and colleagues' (2003) systematic review of anti-spasticity agents for multiple sclerosis led them to the conclusion that "no recommendations can be made to guide prescribing. The rationale for treating features of the upper motor neurone syndrome must be better understood" (p. 8).

While there is some research that more broadly examines spasticity management methods, these reports either focus on the range of possible treatment methods for a specific client population (LaBan, Martin, Pechur, & Sarnacki, 1998) or on the array of possible treatment methods that therapists should be using – again, for a specific client population (Gillen, 1998). While there may be some treatment generalities that can be inferred to other client populations with UMN lesions, the existing body of research does not provide or suggest a general decision-making tree for therapists' reference when assessing and treating clients with spasticity due to an UMN lesion. Furthermore, no research was found that investigated the actual use of spasticity management methods across different client populations; moreover, there is no research examining therapists' actual decision-making process surrounding treatments options. Given this state of affairs – a lack of research which clearly directs therapists to particular intervention choices for clients with spasticity, and yet the push for therapists to use evidence-based practice (EBP) to guide clinical decision-making – we need to consider more closely the role of evidence in the context of the therapist's decision-making process in order to highlight other factors that may influence the therapist's choices.

The epidemiological guidelines established for EBP in medical treatments (Sackett, Rosenberg, Muir Gray, Haynes, & Richardson, 1996) do not often capture how occupational therapy and physical therapy interventions address the interplay among the client, the environment and their occupation. The standard levels of evidence model ranks research studies along two dimensions: the ability of the study's internal validity to answer causation questions (e.g., randomized controlled trials – RCT) and the ability of

the study to produce a statistically significant treatment effect (Law & Phelp, 2002). While the internal validity and statistical conclusion may be the gold standard for causality evidence, it may not provide the best evidence to guide therapists or other health professionals in their selection of intervention choices (Hedberg & Larsson, 2003; Rappolt, 2003). Since there is more to therapeutic interventions than the probability of a causality outcome (e.g., diagnosis), practitioners must also concern themselves with client patterns, profiles, attributes, perceptions, occupations, and contexts, given the range of possible intervention strategies and outcomes (CAOT, 1999; Hedberg & Larsson, 2003; Law & Phelp, 2002; Tickle-Degnen & Bedell, 2003). As a result of this complex interaction, RCT studies to examine the effects of interventions on these variables are difficult to design and achieve significant results in occupational therapy and other health professions.

It appears then that the very model that supports best evidence for decision-making within medicine may in fact be too restrictive if applied rigidly within the scope of therapy practice (CAOT, 1999; Rappolt, 2003). In client-centered therapy practice the interpretation of research evidence must be considered along with the individual client's circumstances and preferences, and the therapists' experience and expertise (CAOT, 1999; Dubouloz, Egan, Vallerand, & von Zweck, 1999; Tickle-Degnen & Bedell, 2003). Similar considerations also arise in the nursing literature (Riley, 2003; Thompson, 2003).

Given the relative importance of client evidence and research evidence in the EBP paradigm, it would appear that professional expertise may no longer play a large role in

the decision-making process (Rappolt, 2003). However, Rappolt suggests that in clinical decision-making the professional expertise of the therapist circumscribes the interactions between the client's evidence and the research evidence. She notes that, even when therapists follow a structured systematic approach to integrating research with client evidence, it still requires professional expertise to make the connection applicable for the therapy process of practice.

Tickle-Degnen and Bedell (2003) suggest that there should be a "method for therapists to include all relevant, valid and available research evidence for making clinical decisions" (p. 234). However, given the ranking of research along the levels of evidence model, it is difficult to devise a process that allows for hard quantitative evidence to be considered equally with 'soft' qualitative data in reviewing outcomes measures (McCormack et al., 2002). Even though qualitative research is gaining acceptance in some arenas of practice, there remains very little information on how to systematically integrate the findings into clinical decision-making for health care professionals (Rappolt, 2003; Thompson, 2003). As a result, health care professionals may use heuristics, or cognitive shortcuts, to make sense of information regarding clinical decisions (Thompson, 2003).

In this context, not surprisingly, research shows that even though rehabilitation therapists are strongly encouraged to use research in their clinical practice, therapists are most influenced by – and are heavily dependent upon – their colleagues for new clinical information (Bohannon, 1990; Curtin & Jaramazovic, 2001; Lysaght, Altschulyld, Grant, & Henderson, 2001; Pain, Magill-Evans, Darrah, Hagler, & Warren, 2004; Rappolt &

Tassone, 2002; Sweetland & Craik, 2001). In one study, even when the therapists were heavy consumers of continuing education, they tended to report relying on their peers for support in the implementation of the new information into practice (Rappolt & Tassone, 2002).

It is reported in the nursing literature that specific clinical decision-making activities vary according to education, experience, appointment levels, perceived roles, and facility location (Aitken, 2002; Bucknall, 2000; Hedberg & Larsson, 2003, 2004; Hoffman et al., 2004). One study found practitioners with less than 5 years experience tend to take more time processing a decision, delay reporting their findings and refer problems to more senior nurses in the unit (Bucknall, 2000). The reliance on more senior team members points to the influence of role, appointment level and experience within the decision-making process (Bucknall, 2000; Hoffman et al., 2004). Hoffman and colleagues (2004) found that while education was related to the desire to make decisions, experience and educational levels were not found to influence decision-making strongly.

The complexity of the practice environment – the unpredictability of the client's situation, teamwork dynamics, interdisciplinary knowledge and relationships, new technology advances – contributes to the amount of time and difficulty involved with the decision-making process (Aitken, 2002; Bucknall, 2003). There are many influences, some conflicting, which affect the clinical decision-making process. Additionally, the factors contributing to EBP decision-making process in medical management may not be the same as those that drive the occupational and physical therapy processes.

This study will investigate the factors that influence therapists' decision-making from among the range of therapeutic intervention techniques for spasticity management. The scope of this project will investigate spasticity therapeutic intervention choices and the decision-making processes among occupational and physical therapists, across professions, across client ages and diagnostic categories, and across practice settings and locations within Canada and the United States. It is hoped that this study will produce information to identify critical elements in the therapists' decision-making processes (Neistadt, 1996) that will lead to examination of key factors influencing the decision-making processes for the therapeutic intervention in the management of spasticity in clients with UMN syndrome (Mattingly, 1991). Ultimately, identifying such influential factors may provide educators with more guidance on how to train therapists for effective decision-making in spasticity management.

2.1 Research Questions

What therapeutic interventions are being used by occupational and physical therapists who self-identify as working in spasticity management in North America, and how are those therapists' intervention choices correlated with their profession, education, practice setting, practice profile, and team environment?

Chapter 3 Methodology

3.1 Purpose

The purpose of this study was to analyze selected questions from survey data obtained from a sample of occupational and physical therapists working with clients who experience spasticity and generalize the results to the entire population of occupational and physical therapists working in the area of spasticity management. It was hoped that inferences would be made regarding how (or if) various factors were influencing therapists' spasticity management intervention choices. The specific questions asked and how the data were used to address these questions are outlined in section 3.4 "Variables and Data Analysis".

3.2 Instrumentation

The selected question data set for this thesis was obtained from a survey that I designed and which received ethics approval from the Dalhousie's Research Ethics Board on June, 23, 2003 (Ethics Approval # 2003-646). Please refer to Appendix A for survey questions (please note the survey has been reformatted from the original booklet to meet editorial guidelines of this thesis document) and to Appendix B and C for the Ethics submission and respective approval Letters from both the Dalhousie and Mount Saint Vincent University ethics review boards.

The cross-sectional surveys were sent out and collected during the months of August 2003 through October 2003. Mail procedures were chosen to provide access to the widely dispersed therapist population in Canada and the United States. The paper survey

also allowed respondents time to give thoughtful answers and to increase the validity of responses by reducing the social desirability factor (Fowler, 1993).

Multiple efforts were taken to strengthen the reliability and validity of the Spasticity Management Survey. The survey's reliability was maximized by: (a) designing the survey items with complete wording, (b) providing definitions for potentially ambiguous terms, (c) providing each question with a list of possible responses, and (d) designing the questions so that they were both exhaustive and mutually exclusive. The survey's validity was maximized by: (a) designing survey items that are understood consistently by all subjects (see above); (b) designing survey items that all subjects should be able to answer; (c) providing possible responses that help subjects estimate the answer, in the event that they are unsure of the answer; (d) ensuring confidentiality and anonymity to minimize feelings of judgment (i.e., the social desirability effect) (Fowler, 1993). A field test was conducted with ten occupational and physical therapists to ensure content validity (Creswell, 2003). The testers were selected based upon different levels of experience, practice environment and discipline (OT and PT). Minor language revisions were made to a few survey questions following the field test. Given this consideration, it was hoped that each participant consistently experienced the survey (Fowler, 1993).

Every effort to improve the response rate and prevent a non-response error was employed in the design and implementation of the mail out survey (Mangione, 1995). Participants received a cover letter (Appendix D) which provided the following information: (a) the name of the organization conducting the research; (b) a brief description of the purposes

of the research; (c) a statement regarding confidentiality and anonymity, with an explanation of the numbered return envelope; (d) assurance that participation was voluntary and that no negative consequence would result to those choosing not to participate; (e) assurance that subjects could skip any questions that they did not want to answer; and (f) an overview of any risks and benefits of participation (Fowler, 1993).

In addition, the cover letter explained to the recipients that, in completing and returning the survey, they were providing their informed consent for the researchers to use their completed survey as data for potential publications. A separate consent form was deemed unnecessary since there was no risk of harm to the participant, their data was confidential, and participants in anonymous surveys are not usually asked to sign forms (Fowler, 1993). Anonymity was achieved by placing an identifier (i.e., a number) on the return envelopes. The numbered envelope was stripped from the returned survey and surveys were not identified with any numbers that could track the individual respondents. The envelope number was recorded and the corresponding address was taken off subsequent reminder mailings. There was absolutely no attempt to link the returned surveys with subjects' identifiers. Anonymity and confidentiality of the respondents has been protected and maintained by only reporting aggregate statistics; individual subjects' responses are not reported or, nor will they be published.

The survey was designed to be user friendly. Questions were structured to have a minimal writing requirement and attempts were made to provide answer options that might capture a wide range of responses. Each survey sent contained a self-addressed

envelope with return postage. A structured schedule for sending reminder notices (see Appendices E to G for the participant reminder letters), or a second survey to non-responders, was followed to gently encourage participants to respond (Dillman, 1978; Fowler, 1993; Mangione, 1995). The mail-out schedule occurred over the course of eight weeks with reminder letters being sent at weeks 2 and 6, and a second survey being sent at Week 4. The final collection of surveys occurred at approximately 12 weeks following the initial mailing. A few extra weeks were allowed for accepting completed surveys due to some external challenges that possibly affected the timing of the survey mailings and ability for participants to respond in a timely manner. The external challenges affecting the mail out system were the Northeast Power Outage (August 14, 2003) and Hurricane Juan (September 29, 2003).

3.3 Population and Sample

The use of probability sampling in combination with the survey method of data collection allowed for generalization of the sample findings to the population of interest (Creswell, 2003). The single stage random sample of occupational and physical therapists was obtained from the membership lists belonging to the Canadian Association of Occupational Therapists (CAOT), the Canadian Physiotherapy Association (CPA), the American Occupational Therapy Association (AOTA), and the American Physical Therapy Association (APTA). The specific lists obtained were the subset of therapists who self-identified as practicing in the field of adult neurorehabilitation. It was believed that the benefit of a specified mailing list would increase the chance that the therapists had related experience with clients and spasticity, and that the response rate would be

positively affected due to interest in or experience with the survey content. The total populations thus attained were as follows: 2144 total therapists, 599 from Canada (112 for CAOT and 487 for CPA), and 1545 from the United States (590 from AOTA and 955 from APTA). The adult neurorehabilitation subset obtained from the national associations does not necessarily reflect the total possible number of therapists working with clients experiencing spasticity. However, aside from the 4 national organizations listed, there are no other professional organizations which catalogue addresses or practice preferences for OTs and PTs. Therefore, therapists not on the national professional organization lists were an unknown quantity for population consideration.

In total, the project budget allowed for 900 surveys to be mailed to a stratified random sample of occupational and physical therapists in Canada and the United States (the rationale behind this chosen number of surveys is given later in this subsection). A probabilistic systematic sampling procedure was used to select a stratified sample of 436 therapists from Canada (112 Occupational Therapists and 324 Physiotherapists) and 464 from the United States (216 Occupational Therapists and 248 Physical Therapists), for a total sample size of 900 (Fowler, 1993; Sample Size Calculator). The CAOT mailing list was not randomized since the entire list was used for the survey mail out. The selected CPA and the APTA mailing lists were randomized using a Monte Carlo program (Press, Flannery, Teukolsky, & Vetterling, 1986). The APTA mailing list was obtained already in a randomized state.

Before providing the rationale for the number of surveys sent, it can first be noted that while the probabilities of selection were constant across strata *within* the Canadian and American sub-samples, Canadian and American therapists were sampled at unequal rates in order to collect an adequately sized sub-sample of Canadian therapists (Mangione, 1995). Without this unequal rate of selection, the number of Canadian therapists within the overall sample would be too small to permit accurate statistical description of the Canadian therapists; similarly, comparison of the Canadian and American therapists would be flawed. Given that the minimum response rate considered “acceptable” ranges from 30% (Bailey, 1997) to 60% (Mangione, 1995), it was anticipated at the time of sending the surveys that a 40-50% response rate would serve as the lower limit for this study to ensure representativeness to the larger population – a point that, in fact, was actually accomplished, with the overall response rate being 54.9%.

To arrive at the number of surveys actually sent out (the sample size), the following procedure/rationale was followed. In general, determining the sample size necessary to estimate a population parameter requires an approximation of the population proportion and variance; typically, this information is available from previous studies, pilot studies or clinical experience. In situations where no prior information is available regarding these parameters, approximate values are substituted with conservative estimates (Scheaffer, Mendenhall, & Ott, 1990). The trade-off is that this method usually produces sample sizes greater than necessary. To make such a conservative estimate, an online “sample calculator” (*Sample Size Calculator*) was used and a 95% confidence level and 5% margin of error was assumed, based on the “worst case” response percentage for any

given question of $p=0.50$, and finally was assuming a roughly 50% survey response rate. Under these assumptions, and considering the total of 2144 overall population of therapists (OT and PT, Canada and USA, combined), we find that the overall required sample size is 652 (from which, 326 returned surveys would be needed, since I assumed 50% would be returned). This would be the minimal requirement, which would not necessarily allow for sub-group analysis by individual group populations (AOTA, APTA, CPA, and CAOT).

Thus, the actual number of surveys sent out was chosen to be greater than the minimal 652, with an attempt to balance the sampling to allow representative comparisons among the four sub-group populations, as discussed above. Table 3.1 and 3.2 summarize the estimated number of surveys that were required to be sent to all four professional associations based upon population estimates and a 5% margin of error (*Sample Size Calculator*). However, as the tables illustrate, the final weighting of the mail out populations were modified with the consideration of balancing the available budget and the desire for attaining as close to a 5% margin of error as possible within each group. Note that all estimates for the number of return surveys needed in each category were based upon the same assumptions outlined above (95% confidence level and 5% margin of error) unless otherwise noted in the Tables 3.1 and 3.2. At the time of mail out planning, the Canadian PT estimate was done based on information from CPA that indicated the size of its population to be 466 therapists, but the actual number of names received from CPA was a little higher (487).

CANADA

Total Targeted Population = 599 (note: had planned for population of 578)		
Estimate for Total # of Return Surveys needed = 234 (based on 5% margin of error)		
	OT	PT
Population: Number of Therapists	112	487 (planned for 466)
% of Total Targeted Population	19 % (112/599)	81 % (487/599)
~ Return Surveys Needed per Sub-Group based upon 5% margin of error	87	215
~ Number of surveys to be sent out	112	430
*Actual # of surveys sent out: based upon sampling ALL of the OT's (112) and reducing PT sampling (budgetary restrictions)	112	324
*Actual # RETURNED surveys	68	210

Table 3-1 Canadian Therapy Population Estimates

USA

Total Targeted Population = 1545		
Estimate for Total # of Return Surveys needed = 308 (based on 5% margin of error)		
	OT	PT
Population: Number of Therapists	590	955
% of Total Targeted Population	38 % (590/1545)	62 % (955/1545)
~ Return Surveys Needed per Sub-Group based upon 5% margin of error	233	274
~ Number of surveys to be sent out based upon 5% margin of error	466	548
Total # of USA Surveys the budget could afford! = 464		
~ Return Surveys Needed per Sub-Group based upon 8.5% margin of error	109	117
~ Number of surveys to be sent based upon 8.5% margin of error	218	234
*Actual # of surveys sent out:	216	248
*Actual # RETURNED surveys	111	105

Table 3-2 US Therapy Population Estimates

3.4 Variables and Data Analysis

A combination of descriptive and inferential statistics was used to describe this study's findings. Table 3.3 summarizes the survey questions that were used to determine the

influences on the individual therapist, the team or environment, and the therapeutic intervention decisions.

INDIVIDUAL Influences	Survey Question	Description of Question
Therapist Designation	Q2	Licensed to Practice in OT or PT
Experience Descriptors	Q3	Years practiced since graduation
	Q4	Years practiced in neurorehabilitation
Caseload Descriptors	Q1	Percentage of client caseload with spasticity
	Q7	Age Group of client caseload
	Q8	Diagnostic category(ies) of caseload
Practice Setting	Q5	Type of facility
Practice Location	Q6	Rural vs Urban
Academic Preparation	Q9	University lectures/courses on OT/PT spasticity management
	Q10	University lectures/courses on medical/surgical spasticity management
Continuing Education	Q12	Attendance at spasticity management CE
Referral Pattern	Q14	Does the therapist refer as an adjunct for spasticity management
	Q16	Length of treatment prior to referral for spasticity medical management
TEAM ENVIRONMENT Influences	Survey Question	Description of Question
Team Members	Q13	Description of the members of their treatment team or referral sources
Relationship with physician	Q15	Working relationship with the physician and spasticity management
Concerns regarding medical management	Q17	Description of the possible therapist concerns regarding referral for the medical management of spasticity
THERAPEUTIC INTERVENTION DECISIONS	Survey Question	Description of Question
OT/PT techniques	Q30	Range of techniques for UMN syndrome
Client characteristics	Q31	Influences affecting therapeutic interventions for spasticity
Other factors	Q32	Factors beyond Q31 influencing therapeutic interventions for spasticity

Table 3-3 Survey Questions to be Considered for Analysis

Frequencies or percentages were used to describe the therapists surveyed in terms of:

- their individual influences on clinical decision-making
- their patterns of interaction with interprofessional team members
- the factors affecting their decision-making around physician referrals
- their choice of therapeutic intervention(s)
- their shifts in clinical decision-making, in response to client and external factors

Thus, with the aim of attempting to identify how individual and practice factors are correlated with therapists' clinical decision-making (both as seen in terms of specific choices of techniques, and in their own perception of what influences their thinking), the survey responses were used to address a series of specific questions for each individual "potential influencing factor" (or combination of "potential influencing factors"). To illustrate, following is an example of the questions that were asked related to understanding the ways therapists' "years of experience" may relate to the decision-making process:

1. *Question:* How was "years of neurorehabilitation experience" related to the therapists' choice of treatment techniques?

- *Method to address question:* compare the pattern of Q30 (spasticity only) responses to different experience levels, as given in answer to Q4 (separately), and see if any distinct trends were apparent.
- If a trend was evident, then the following *Supplementary Question* was posed:

What are the characteristics of the change (e.g., which experience groups selected particular techniques more or less frequently than the other groups)?

2. *Question:* How was “years of neurorehabilitation experience” related to therapists’ identification of client characteristics important for treatment decisions?

- *Method to address question:* as above for Question 1, now comparing Q31, 32 responses to different experience levels (given and Q4).
- Again, as above for Question 1, if a trend is seen in the Q31, 32 responses, a similar *Supplementary Question* can be posed:
Can the trend be characterized?

These same direct questions, outlined above for just one factor that was related to therapists’ clinical decisions (“Experience”), were asked and examined separately for selected items listed in Column 1 of Table 3.3 (Caseload Descriptors, Practice Setting, Practice Location, etc.) – including those items under “Team Environment Influences”. Then, depending on the outcome of searches for trends in treatment technique choices and identification of (and importance of) client characteristics, it was possible to ask the same questions for combinations of these individual factors.

Section 4.1 outlines the breakdown of the respondents’ profile in terms of the items listed in Table 3-3. Section 4.2 goes on to examine the trends in respondents’

decisions for spasticity management (as revealed by answers to Q30-32), with the specific influencing factors from Table 3-3 used in the analysis being clearly outlined.

It was difficult to predict ahead of time what these trends may look like, and it was not clear if they would be an indicator of how these many varied (and sometimes conflicting) factors were related to clinical decision-making. Section 4.1 and 4.2 provide an examination of the therapists' influencing factors as well as the trends for treatment technique selection.

Statistical Analysis of the Trends

The method used to explore the above described trends in the decision-making patterns reflected by responses to Q30-32 was as follows. Specific responses in Q30-32 were compared between subgroups of therapists with the total population – with these subgroups defined by selected items from Table 3-3.

The primary comparison was to determine if different subgroups chose responses in Q30-32 at different frequencies (thereby giving an indication that a particular response was more or less favoured by a subgroup). Thus, these types of comparisons were done using the Chi Square statistic (appropriate, since the subgroups chosen are mutually exclusive), with the null hypothesis being that all subgroups respond with the same proportions. Note, that since the subgroups investigated for comparison have varying sizes, these Chi Square comparisons were all done accounting for the proportion of each subgroup in the full sample (Portney & Watkins, 2000).

Additionally, comparisons to determine if different subgroups had a different ranking order for their responses within Q30-32 (both of which are ordinal in nature) were completed. The Mann Whitney U test was performed when comparing to see if a

rank-order was different between two subgroups, and the Kruskal-Wallis test was used when comparing among more than two subgroups (Portney & Watkins, 2000, Bailey, 1997).

Chapter 4 Survey Results

The responses from the 492 surveys received were coded and entered into an SPSS data base (SPSS 11.5.1, 2002). All results shown in this chapter were extracted from the surveys using SPSS. The analysis begins with describing the characteristics of the respondents in terms of their individual influences, team environment influences, and the overall pattern of therapeutic intervention choices. Finally, the interaction of the individual influences with their therapeutic intervention decisions will be investigated, as outlined at the end of Chapter 3. Please note that for the purposes of brevity and ease of reading the analysis section, the disciplines of Occupational Therapy and Physical Therapy will be denoted by OT and PT respectively.

4.1 Survey Respondent Characteristics

In the following subsections the survey responses to specific questions illustrate the profile of the therapists' characteristics in relation to their individual professional designation, practice environment, team environment and educational background.

4.1.1 Individual (Q 1, 2, 3, 4)

As noted in the methodology chapter, the survey was sent to therapists within four professional organizations in Canada and the United States. Respondents were asked in Q2 to identify the profession they were licensed to practice. The association of origin was identified by the identification number on the envelopes in which the respondent returned the survey. The response rate per designated professional therapist group and association is listed in Table 4-1 below.

SOURCE	Total Surveys Sent	Total Response	Response Rate	Percentage of total Responses	Margin of Error (at 95% Confidence Level)
CAOT	112	68	60.7%	13.8%	± 7.5%
CPA	324	210	64.8%	42.5%	± 5.1%
APTA	248	105	42.3%	21.2%	± 9.0%
AOTA	216	111	51.4%	22.5%	± 8.4%
Total OTs	328	179	54.6%	36.2%	± 6.8%
Total PTs	572	315	55.1%	63.8%	± 4.6%
Canadian Therapists	436	278	63.8%	56.3%	±5.1%
American Therapists	464	216	46.6%	43.7%	±6.2%
ALL	900	494	54.9%	100%	± 3.9%

Table 4-1 Survey Response Rate and Margin of Error for Extrapolating to Populations

Referring back to Tables 3-2 and 3-3 for the size of each association's target population, margins of error can be calculated for how well the data is representative of each population (Sample Size Calculator). These margins of error are shown in Table 4-1. Also shown are margins of error for groupings of therapists (OT and PT, Canadian and American) and for the full targeted population. In this thesis the focus of analysis will be on the full response set and that of the total OT and total PT subgroups.

In order to capture data from therapists who were actively treating clients experiencing spasticity, the respondents' first question on the survey asked 'What percentage of your client caseload experiences spasticity?' Of the 494 therapists who responded to the survey, 89 therapists identified that their caseload did not include clients with spasticity and therefore did not meet the criteria to complete the remaining survey. The 405

respondents who identified that they treated clients experiencing spasticity are found in Table 4-2 below and are separated into their professional association grouping.

SOURCE	Total Response	Respondents Self-Excluded from Study (Q1= 5 "does not treat")	Surveys Analyzed
CAOT	68	11	57
CPA	210	55	155
APTA	105	11	94
AOTA	111	12	99
	494	89	405

Table 4-2 Respondent Profile- Number Treating Spasticity

Note that one could consider treating the fraction of received responses that "self-excluded" themselves from the study via their answer to Q1 as a measure of the reliability of how well each professional association's provided list reflects the desired target therapist population (i.e. the true target population for each association could be decreased by the fraction of respondents from that association who self-excluded). However, going through the process of re-estimating each association's target population downward in this way, and re-calculating the margins of error for generalizing the results using the "surveys analyzed" numbers from Table 4-2 for the response-rate, yields nearly identical results as are shown in Table 4-1 (this because the combined reduction of both the target population estimate and the number of responses used serve to offset each other). Given this, and given that the fraction of self-identified neurorehabilitation therapists who indicate they do not treat any clients experiencing spasticity is an interesting piece of data in its own right, this additional re-estimation procedure was avoided to maintain clarity of discussion.

Further note that, since the survey was a voluntary commitment, respondents were given a choice to reply to as many, or few, questions as they self-selected. Given this situation, there will be many tables within the analysis below in which the total number of respondents fluctuates to numbers fewer than 405 for specific questions. To accommodate this situation, results for particular questions may also be presented as percentages of the number of respondents who answered that particular question.

The profile of years of practice since graduation was gathered in Survey Q3 by asking the respondents ‘How many years have you been practicing since graduation?’ The 403 responses were distributed as follows: 0-5 Years, 67 cases (16.6%); 6-10 Years, 91 cases (22.6%); 11–15 Years, 69 cases (17.1%); and greater than 15 Years, 176 cases (43.7%). See Figure 4-1 below, where the bar heights are percentages of total respondents.

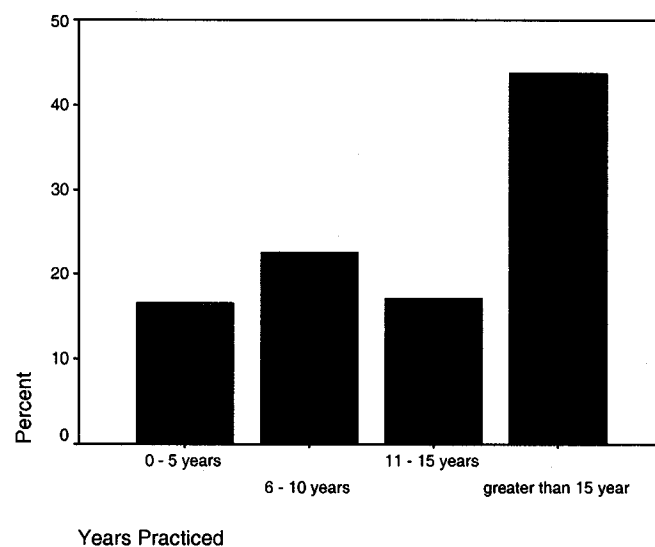


Figure 4-1 Respondent Profile – Years of Experience

The respondents were further delineated by the number of years that they had been practicing in the area of neurorehabilitation. Survey Q4 asked ‘how many years have you been practicing in the area of neurorehabilitation?’ The 402 who responded to the question were distributed as follows: 0-5 Years, 100 cases (24.9%); 6-10 Years, 106 cases (26.4%); 11–15 Years, 84 cases (20.9%); and greater than 15 Years, 112 cases (27.9%). See Fig 4-2 below where the bar heights are percentages of total respondents.

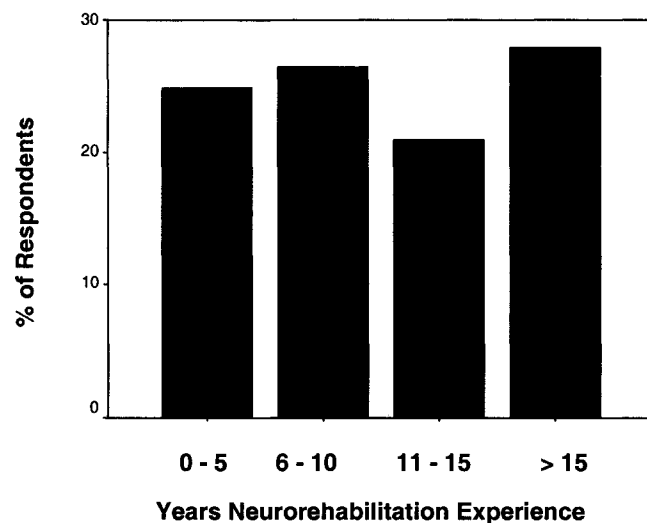


Figure 4-2 Respondent Profile – Years of Neurorehabilitation Experience

To further describe the individuals found in each of the years of neurorehabilitation experience categories, a crosstabulation analysis of the respondents’ years of practice since graduation and years of practice in neurorehabilitation is shown in Table 4-3 below.

Years Neuro * Years Practiced Crosstabulation

			Years Practiced				Total
			0 – 5 years	6 – 10 years	11 – 15 years	> 15 years	
Years Neuro	0 - 5 years	Count	66	19	5	10	100
		% within Years Practiced	100.0%	20.9%	7.2%	5.7%	25.0%
	6 - 10 years	Count	0	70	22	14	106
		% within Years Practiced	.0%	76.9%	31.9%	8.0%	26.5%
	11 - 15 years	Count	0	2	41	40	83
		% within Years Practiced	.0%	2.2%	59.4%	23.0%	20.8%
	> 15 years	Count	0	0	1	110	111
		% within Years Practiced	.0%	.0%	1.4%	63.2%	27.8%
	Total	Count	66	91	69	174	400
		% within Years Practiced	100.0%	100.0%	100.0%	100.0%	100.0%

Table 4-3 Respondent Profile – Practice and Neurorehabilitation Experience

Note that although the respondents are distributed approximately equally in their years of neurorehabilitation experience, the majority of respondents have greater than 15 years of practice experience overall. Of interest there are two responses that appear to be impossible – those respondents who recorded that they had more years of experience than years of total practice. All three of these responses were recorded from Canadian PTs. The most likely explanation for the response is that the therapists either incorrectly completed the survey, or it is remotely possible that they have been a practicing health professional in the area of neurological rehabilitation prior to becoming licensed as a PT (e.g., a dual trained OT/PT therapist may have been working as an OT prior to being licensed as a PT, and/or they could have worked as PT assistant or other health professional prior to training to become a licensed PT).

Finally, the individuals found in each of the years of neurorehabilitation experience categories were delineated by their professional identification (OT, PT). Table 4-4 below shows a cross tabulation analysis of the respondents into their professional designation

(Q2) as well as years practiced in neurorehabilitation (Q4). This is also graphed in Figure 4-3.

			OT	PT	Total
Years Neuro	0 - 5 years	Count	30	70	100
		Column %	19.2%	28.5%	24.9%
	6 - 10 years	Count	49	57	106
		Column %	31.4%	23.2%	26.4%
	11 - 15 years	Count	36	48	84
		Column %	23.1%	19.5%	20.9%
	> 15 years	Count	41	71	112
		Column %	26.3%	28.9%	27.9%
Total		Survey Count	156	246	402
		Column %	100.0%	100.0%	100.0%

Table 4-4 Respondent Profile – Neurorehabilitation Experience per Discipline

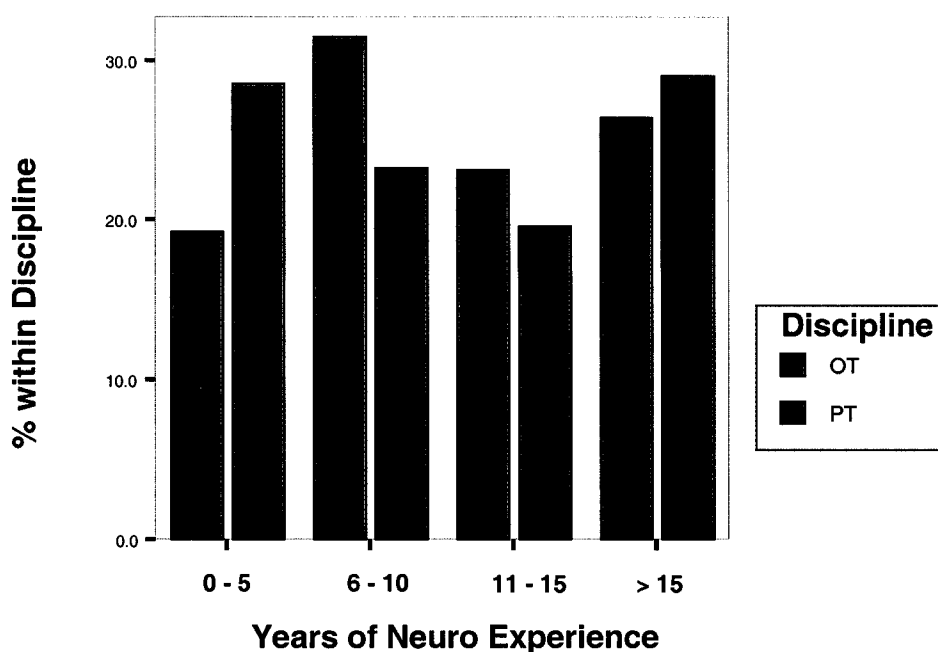


Figure 4-3 Respondent Profile – Neurorehabilitation Experience per Discipline

The number of respondents in each of these groups is presented here (and later) to better inform the subsequent attempts to describe the influencing factors on therapeutic

intervention choices. The relative percentage of distribution between OTs and PTs among the different neuro experience groups appears to be relatively the same. While it may appear that the relative amount of OTs and PTs may differ within the 0-5 year experience group according to the bar chart, the Chi-square (χ^2) shows that there is no statistically significant difference ($\chi^2= 3.261$, $df=1$, $sig=.071$).

4.1.2 Practice Environment (Q 5, 6)

The respondents were asked to identify if their practice environment was urban or rural (Q6). The rural practice location was selected by 69 (17.1%) respondents while 334 (82.9%) identified their practice setting as urban. While there were 4 non-respondents to the practice location question, 2 respondents selected that their practice location was both the rural and urban environment. To further describe the rural and urban respondents have been divided into their designated discipline in Table 4-5 below. A Chi-square (χ^2) shows that there is no significant difference between OT and PT with regards to their practice location profile (Rural: $\chi^2= 1.241$, $df=1$, $sig=.265$; Urban: $\chi^2= .234$ $df=1$, $sig=.629$). Note that Chi-square comparisons were done for the two practice location choices (rural, urban) separately, since these two choices were not mutually exclusive (i.e., some therapists chose both rural and urban since their practice encompassed both locations).

			OT	PT	Total
Practice Location	Location - Rural	Count	31	38	69
		Column %	20.1	15.4	17.2
	Location - Urban	Count	124	210	334
		Column %	80.5	85.0	83.3
Total		Survey Count	154	247	401
		Column %	100.0	100.0	100.0

Table 4-5 Respondent Profile – Practice Location

The respondents were asked to further identify the best descriptors of their ‘practice setting’ (Q5). The following Table 4-6 describes the percentage of respondents in terms of their current practice setting. Since respondents were allowed to check more than one response, the total number of responses (531) is greater than the total number of survey counts (399). However, it is realistic that therapists could be working concurrently within different practice environments.

			OT	PT	Total
Practice Setting	Setting - acute	Count	48	46	94
		Column %	31.2	18.8	23.6
	Setting - rehab	Count	122	158	280
		Column %	79.2	64.5	70.2
	Setting - home care	Count	6	36	42
		Column %	3.9	14.7	10.5
	Setting - long-term	Count	18	38	56
		Column %	11.7	15.5	14.0
Setting - private practice	Count	11	48	59	
	Column %	7.1	19.6	14.8	
		Total Responses	205	326	531
Total	Survey Count		154	245	399
	Column %		100.0	100.0	100.0

Table 4-6 Respondent Profile –Practice Setting

As previously stated, the results are being presented in a format where the quoted percentages are with respect to the number of surveys with an answer for the question, and not with respect to the total number of responses for that question – since multiple responses were a possibility for practice setting. The majority of respondents, regardless of their discipline, indicated that their practice setting is best described as a rehabilitation setting (79.2 % for OT and 64.5% for PT). A Chi-square (χ^2) analysis shows that there is no significant difference between OT and PT with regards to their practice setting proportions for the rehabilitation (χ^2 . = 2.911, df=1, sig.=.088) and long term care settings (χ^2 . = .977, df=1, sig.=.323). There were significant differences found in the proportions of OTs and PTs in the other settings, with more OTs in acute care (χ^2 . = 6.144, df=1, sig.=.013), and more PTs in both home care and private practice settings (home care χ^2 . = 10.455, df=1, sig.=.001; private practice χ^2 . = 9.953, df=1, sig.=.002).

4.1.3 Caseload Description (Q 1, 7, 8)

As mentioned earlier, in order to collect a profile of current practice, respondents were asked to estimate the percentage of their current client caseload experiencing spasticity. Table 4-7 presents the caseload percentage per discipline of the respondents. Five surveys did not answer this question, but did complete other questions on the survey. The majority of OT and PT respondents described their caseloads as having 50% or less of their clients experiencing spasticity. Of interest is that 20% of the PT respondents reported having 76 – 100% of their clients experiencing spasticity. These differing caseload percentages could indicate that most therapists are not carrying caseloads where spasticity management is the predominant clinical challenge, or, it could also indicate the

extent to which the issue of spasticity management influences the overall practice management (i.e. recurrent caseload challenges could influence the decision making process).

			OT	PT	Total
Caseload % with Spasticity	less than 25%	Count	46	89	135
		Column %	30.1	36.0	33.8
	26-50%	Count	67	69	136
		Column %	43.8	27.9	34.0
	51-75%	Count	26	41	67
		Column %	17.0	16.6	16.8
	76-100%	Count	14	48	62
		Column %	9.2	19.4	15.5
Total		Survey Count	153	247	400
		Column %	100.0	100.0	100.0

Table 4-7 Client Caseload Description – Percentage Experiencing Spasticity

Respondents were asked to describe their current client caseload in terms of age group(s) (Q7) and neurological diagnostic population(s) (Q8). Again, in these two questions, respondents were allowed to check more than one response which explains why the total number of responses is greater than the total number of survey counts (cases). [Note, I won't say this again ☺!] Table 4-8 and Figure 4-4 present the respondents' caseload in terms of client age profile distribution and Table 4-9 and Figure 4-5 present the respondents' caseload in terms of client neurological diagnostic categories.

			OT	PT	Total
Population Age	age - Infant & Children	Count	13	43	56
		Column %	8.3	17.3	13.8
	age - Adolescent	Count	20	53	73
		Column %	12.8	21.3	18.0
	age - Young Adult	Count	66	95	161
		Column %	42.3	38.2	39.8
	age - Adults	Count	95	145	240
		Column %	60.9	58.2	59.3
	age - Middle Adults	Count	124	180	304
		Column %	79.5	72.3	75.1
	age - Older Adults	Count	134	195	329
		Column %	85.9	78.3	81.2
Total Responses			452	711	1163
Total	Survey Count		156	249	405
	Column %		100.0	100.0	100.0

Table 4-8 Client Caseload Description – Age Group Categories

It is not surprising that the majority of respondents recorded that their client caseload consisted mainly of the adult range population categories since the mailing lists obtained from the professional organizations were targeted to therapists who worked in neurorehabilitation, but did not specify pediatrics. Additionally, in the adult population, the incidence of stroke and traumatic brain injury have a higher rate of incidence than that of the other neurological diagnostic categories – a trend also reflected in the populations that therapists are identifying as their caseload (Table 4-9 and Figure 4-5).

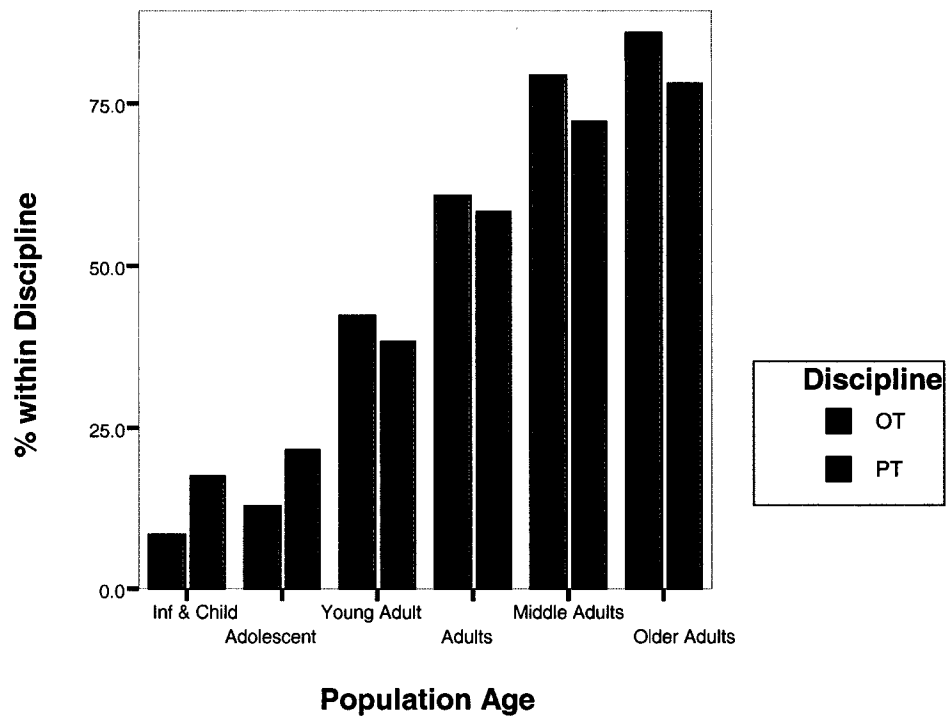


Figure 4-4 Client Caseload Description – Age Group Categories

			OT	PT	Total
Diagnostic Population	diagnosis - TBI	Count	106	155	261
		Column %	67.9	62.5	64.6
	diagnosis - Stroke	Count	138	214	352
		Column %	88.5	86.3	87.1
	diagnosis - MS	Count	64	112	176
		Column %	41.0	45.2	43.6
	diagnosis - CP	Count	19	64	83
		Column %	12.2	25.8	20.5
Total	diagnosis - SCI	Count	61	102	163
		Column %	39.1	41.1	40.3
	diagnosis - Other	Count	23	81	104
		Column %	14.7	32.7	25.7
	Total Responses		411	728	1139
	Survey Count		156	248	404
	Column %		100.0	100.0	100.0

Table 4-9 Client Caseload Description - Neurological Diagnostic Categories

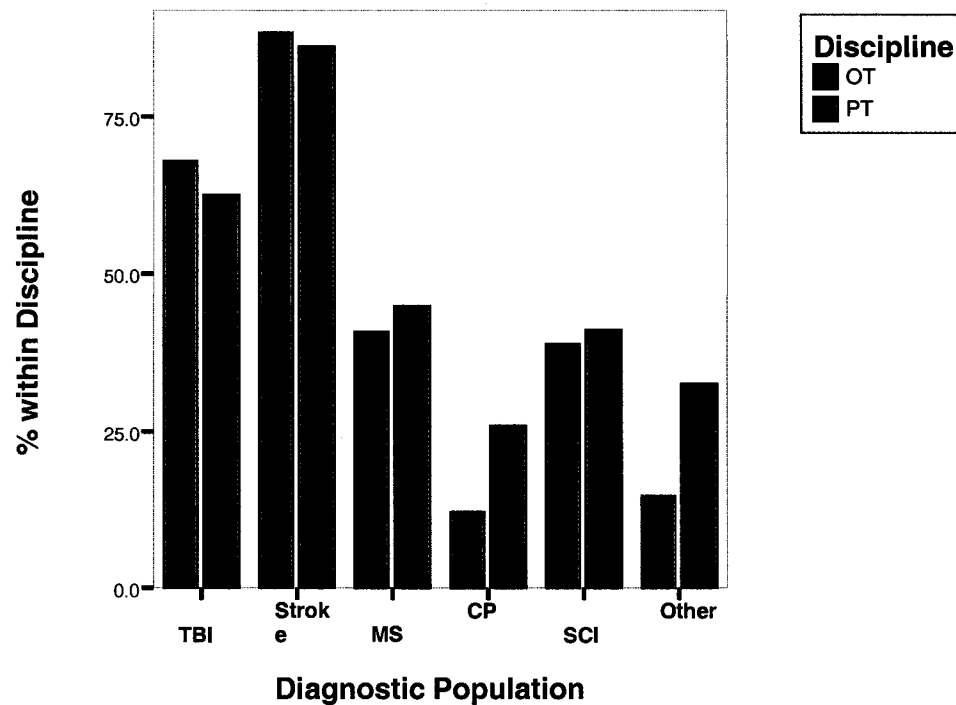


Figure 4-5 Client Caseload Description – Neurological Diagnostic Categories

Populations reported in the ‘other’ category for Q8 inquiring about neurological diagnostic categories experiencing spasticity, included a variety of responses that tended to group into the categories of Parkinson’s, Alzheimer’s/Dementia, Progressive Degenerative Neurological decline and Congenital Neurological deficits.

4.1.4 Education (Q 9, 10, 12)

Respondents to the survey were asked about their academic preparation in the use of occupational and/or physical therapy methods to manage spasticity (Q9). Five respondents wrote that they could not respond to the question given the length of time since graduation. Of the 400 who responded to this question, 32 (8%) stated they did not receive any academic preparation and 368 (92%) stated they did receive education. For the 368 respondents who did receive education, 354 checked the amount of time that was

dedicated to the therapeutic intervention training. Table 4-10 illustrates the distribution of responses for the amount of education received subdivided into years of practice since graduation is reported. Figure 4-6 graphs the column percentages from the table – with different coloured lines representing different levels of practice years since graduation. Note that there were 354 respondents, but only 353 listed in Table 4-10, this is due to one respondent who did not indicate their years of experience.

A Chi-square (χ^2) shows a significant difference ($\chi^2=10.361$, $df=3$, $sig.= .016$) between the proportion of therapists in the different ‘years since graduation’ groups receiving more than one course on therapeutic intervention methods with spasticity. In particular, the therapists who reported graduating more than 15 years ago have a higher proportion who reported receiving more than one course while there with a less than expected proportion of the other groups reporting the same level of education.

			Therapeutic Intervention Education - Spasticity				Total
			1 -3 Lectures	4 -6 Lectures	1 Course	>1Course	
Years Since Graduation	0 - 5 years	Count	42	18	3	1	64
		Column %	20.3	18.8	11.1	4.3	18.1
	6 - 10 years	Count	52	23	3	2	80
		Column %	25.1	24.0	11.1	8.7	22.7
	11 - 15 years	Count	37	17	5	3	62
		Column %	17.9	17.7	18.5	13.0	17.6
	> 15 years	Count	76	38	16	17	147
		Column %	36.7	39.6	59.3	73.9	41.6
Total		Survey Count	207	96	27	23	353
		Column %	100.0	100.0	100.0	100.0	100.0

Table 4-10 Academic Preparation – Therapeutic Methods and Practice Experience

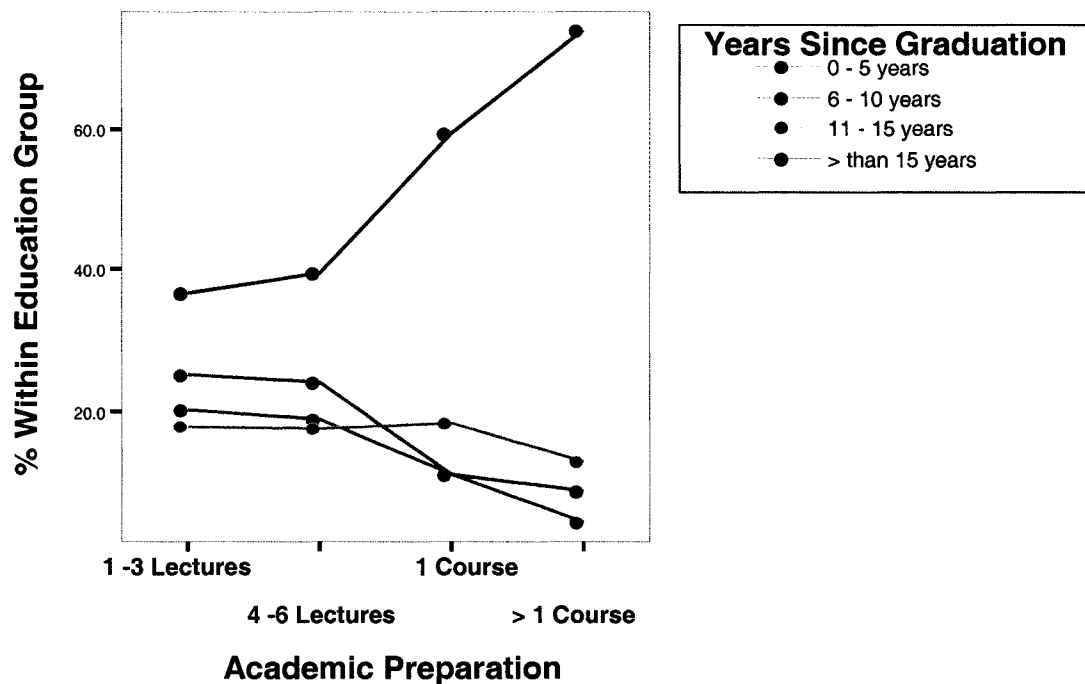


Figure 4-6 Academic Preparation – Therapeutic Methods and Practice Experience

Following a similar manner of delineating the respondents into years of neurorehabilitation experience as was done in Section 4.1.1, Table 4-11 shows how the academic preparation is spread among the years of neurorehabilitation experience levels of the respondents. These data are then presented in Figure 4.7 in the same format as Figure 4.6.

			Therapeutic Intervention Education – Spasticity				Total
			1 -3 Lectures	4 -6 Lectures	1 Course	>1Course	
Years Neuro	0 - 5 years	Count	62	24	6	1	93
		Column %	30.0	25.0	21.4	4.3	26.3
	6 - 10 years	Count	53	31	6	5	95
		Column %	25.6	32.3	21.4	21.7	26.8
	11 - 15 years	Count	46	17	6	6	75
		Column %	22.2	17.7	21.4	26.1	21.2
	>15 years	Count	46	24	10	11	91
		Column %	22.2	25.0	35.7	47.8	25.7
Total		Survey Count	207	96	28	23	354
		Column %	100.0	100.0	100.0	100.0	100.0

Table 4-11 Academic Preparation – Therapeutic Methods and Neuro Experience

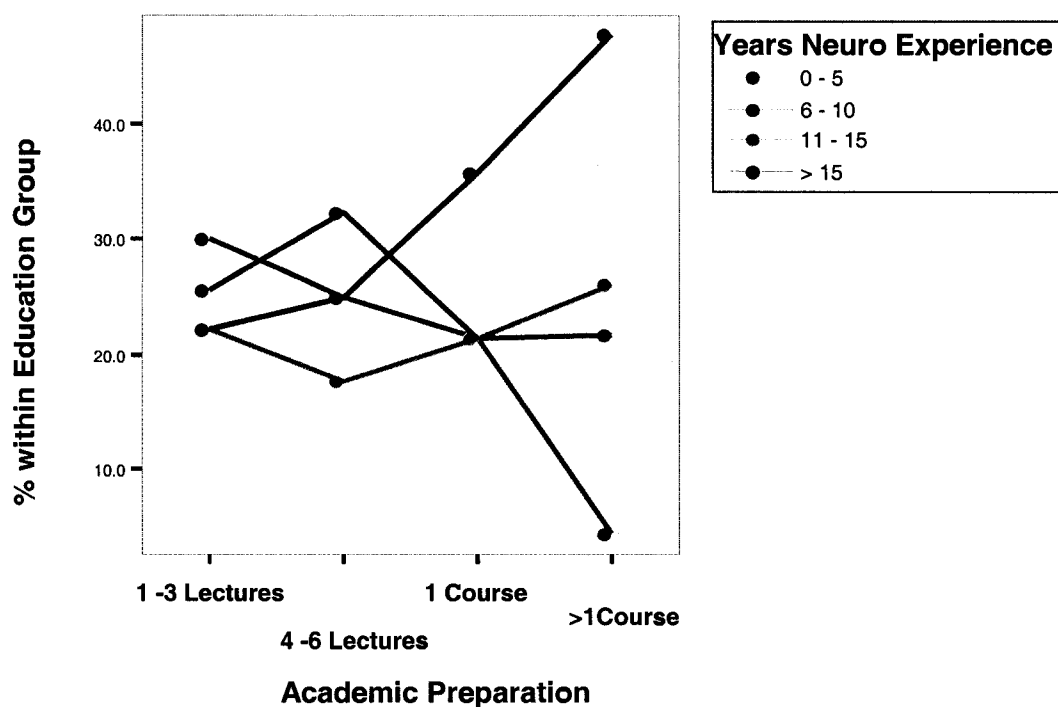


Figure 4-7 Academic Preparation – Therapeutic Methods and Neuro Experience

The noticeable trend in both Figures 4.6 and 4.7 is that there is an obvious inversion between the therapists with the least years of experience (both years practiced since graduation and years of neurorehabilitation experience) and those with the most experience: more of the most experienced therapists reported more than 1 academic course for OT or PT therapy methods to manage spasticity, whereas more of the least experienced neurorehabilitation therapists received only 1-3 lectures. It appears that over time there has been a decrease in the amount of academic preparation of therapists in the area of therapy methods to manage spasticity. A Chi-square (χ^2) indeed shows that there is a significant difference between the proportion of therapists in the different 'years of neuro experience' groups receiving more than one course on therapeutic intervention methods with spasticity ($\chi^2 = 9.054$, $df=3$, $sig.= .029$) – again the most experienced therapists have a greater proportion who received more than one course of training.

A similar pattern also seems to persist within both professional disciplines of OT and PT. Table 4-12 illustrates this pattern for OT and PT by showing the percentages of OT and PT respectively that received the varying levels of academic preparation for therapeutic interventions. However a the Chi-square (χ^2) analysis of the OT and PT groups separately only shows a significant difference for the most experienced OTs when compared with the grouping of less than 15 years of experience: a greater proportion of the most experienced therapists have more than one course of academic preparation with spasticity management ($\chi^2 = 8.865$, $df=1$, $sig.= .003$). No similar statistically significant difference was found within the PT groups.

			Therapeutic Intervention Education								
			1 -3 Lectures		4 -6 Lectures		1 Course		>1Course		
			OT	PT	OT	PT	OT	PT	OT	PT	
Years Practiced	0 - 5	Count	15	27	4	14	1	2	0	1	
		Column %	16.7	23.1	13.3	21.2	12.5	10.5	0	6.3	
	6 - 10	Count	25	27	8	15	2	1	0	2	
		Column %	27.8	23.1	26.7	22.7	25.0	5.3	0	12.5	
	11 - 15	Count	24	13	9	8	2	3	1	2	
		Column %	26.7	11.1	30.0	12.1	25.0	15.8	14.3	12.5	
	> 15	Count	26	50	9	29	3	13	6	11	
		Column %	28.9	42.7	30.0	43.9	37.5	68.4	85.7	68.8	
	Survey Count			90	117	30	66	8	19	7	16
	Column %			100	100	100	100	100	100	100	100

Table 4-12 Academic Preparation – Therapeutic Methods, Years Practiced and Discipline

The survey also inquired if the respondents had received any education on the use of medication and/or surgery to manage spasticity in their academic preparation (Q10). Of the 400 respondents for this question (5 did not respond to this question as in Q9 due to the inability to recall educational details), 38.8% (155 cases) reported no academic preparation and 61.3% (245 cases) reported some level of preparation. Table 4-13 below divides the 245 respondents into years of practice experience and the amount of academic preparation they received in the use of medication and/or surgery to manage spasticity. Out of the 245, 9 did not indicate the amount of education they received. The basic trend shown in this table is that most people in any experience group received only 1 – 3 lectures in their academic preparation. Although the numbers are small, the only therapists who received more than 6 lectures have come from the most experienced group of therapists.

			Medication&/or Surgery Education				
			1 -3 Lectures	4 -6 Lectures	1 Course	>1Course	Total
Years Practiced	0 - 5	Count	52	2	0	0	54
		Column %	24.5	15.4	0	0	23.1
	6 - 10	Count	50	3	0	0	53
		Column %	23.6	23.1	0	0	22.6
	11 - 15	Count	36	1	0	0	37
		Column %	17.0	7.7	0	0	15.8
	> 15	Count	74	7	3	6	90
		Column %	34.9	53.8	100.0	100.0	38.5
	Survey Count		212	13	3	6	234
	Column %		100.0	100.0	100.0	100.0	100.0

Table 4-13 Academic Preparation – Medication and/or Surgery Education

Table 4-14 further shows that there is no apparent difference in this educational aspect between OT and PT respondents. Note the 1 extra survey count shown in the total of Table 4-14 below, compared to Table 4-13 above (235 vs. 234), simply results from one PT respondent, who responded that they had received medical and/or surgical education but did not indicate their years practiced on the survey.

			OT	PT	Total
Medication Education	1 -3 Lectures	Count	54	159	213
		Column %	88.5	91.4	90.6
	4 -6 Lectures	Count	4	9	13
		Column %	6.6	5.2	5.5
	1 Course	Count	1	2	3
		Column %	1.6	1.1	1.3
	>1Course	Count	2	4	6
		Column %	3.3	2.3	2.6
Total		Survey Count	61	174	235
		Column %	100.0	100.0	100.0

Table 4-14 Academic Preparation - Medication and/or Surgery Education and Discipline

The last survey question addressing formal educational training inquired if the respondents had attended any continuing education events on spasticity management (Q12). Of the 401 who responded to the question, 24.7% (99 cases) reported not attending any continuing education, while 75.3% (302 cases) reported attending continuing education. Table 4-15 shows how OTs and PTs responded to this question. Note although a much higher proportion of OTs reported attending continuing education on spasticity management compared to PTs, a Chi square analysis does not find a significant difference at the 95% confidence level ($\chi^2 = 3.711$, $df=1$, $sig=.054$).

			OT	PT	Total
Continuing Education on Spasticity Management	No	Count	22	77	99
		Column %	14.2	31.3	24.7
	Yes	Count	133	169	302
		Column %	85.8	68.7	75.3
Total		Survey Count	155	246	401
		Column %	100.0	100.0	100.0

Table 4-15 Continuing Education – Spasticity Management

Since continuing education on spasticity management may be influencing how therapists currently practice in neurorehabilitation, an analysis of the respondents' attendance at continuing education is presented in Table 4.16. The table delineates the education attendance proportions for each "years of neurorehabilitation experience" group of respondents.

Continuing Education on Spasticity Management		OT				PT			
		Years Neuro				Years Neuro			
		0 - 5	6 - 10	11 - 15	>15	0 - 5	6 - 10	11 - 15	>15
No	Count	6	7	3	6	41	16	7	10
	Column %	20.7	14.3	8.3	14.6	60.3	28.1	14.6	14.3
Yes	Count	23	42	33	35	27	41	41	60
	Column %	79.3	85.7	91.7	85.4	39.7	71.9	85.4	85.7

Table 4-16 Continuing Education – OT and PT Distribution

Figure 4.8 illustrates the breakdown of Table 4-16 respondents into their years of neurorehabilitation experience. Further Chi-square analysis indicates that the only significant difference between the OT and PT attendance of continuing education in spasticity management lies within the 0-5 years of neurorehabilitation experience group ($\chi^2 = 6.273$ df=1, sig.= .012) with a higher proportion of OTs attending. OTs and PTs with more than 5 years of neuro experience attend continuing education for spasticity management in the same proportions.

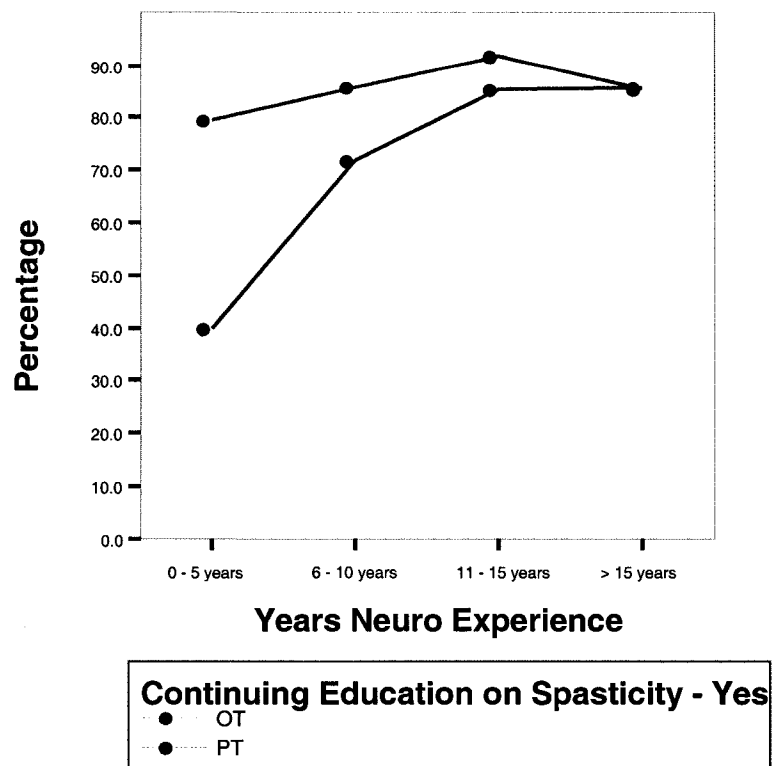


Figure 4-8 Continuing Education Attendance – OT and PT Distribution

One could speculate that there might be a relationship between the level of academic preparation and the attendance at a continuing education event (i.e. therapists who receive less academic preparation may attend continuing education events at a higher proportion to compensate for lack of preparation). However, there is no statistically significant difference found between the proportions of therapists' in the four "level of academic preparation" groups that report attendance at continuing education.

To gain further insight into the respondents' continuing education pattern, respondents who indicated "yes" to Q12 were asked to report when they last attended an event on spasticity management. Table 4-17 presents the number of years since the respondents last attended a continuing education course on spasticity management. The respondents

are also divided into their reported years of experience in the area of neurorehabilitation. These data are shown graphically in Figure 4-9. It is evident that a larger fraction (87.5%) of the therapists with 0 – 5 years of neurorehabilitation experience reported attending an event within the last 2 years – not surprising since they have just started in this clinical area –whereas roughly 50% of the more experienced neuro therapists have attended within the last 2 years, independent of their level of experience. Chi-square analysis comparing the proportions between all four neuro experience groups which attended a continuing education event within the last 2 years, shows that the larger fraction of attendance by the least experienced therapist group is not statistically significant ($\chi^2 = 6.867$, $df=3$, $sig. =.076$). However, a significant difference can be found when comparing the 0-5 year neuro experience group to a combined group containing all other levels of neuro experience ($\chi^2=6.808$, $df=1$, $sig.= .009$); a higher proportion of the least experienced group attended continuing education within the last two years compared to therapists with greater than five years of experience. The overall pattern of attendance at continuing education events is similar for both OTs and PTs.

Continuing Education on Spasticity Management		Years Neuro				Total
		0 - 5	6 - 10	11 - 15	>15	
0 - 2 Years	Count	42	44	40	53	179
	Column %	87.5	54.3	54.8	57.0	60.7
3 - 5 Years	Count	5	30	20	27	82
	Column %	10.4	37.0	27.4	29.0	27.8
6 - 8 Years	Count	1	4	7	6	18
	Column %	2.1	4.9	9.6	6.5	6.1
> 8 Years	Count	0	3	6	9	18
	Column %		3.7	8.2	9.7	6.1
Total	Survey Count	48	81	73	93	295
	Column %	100.0	100.0	100.0	100.0	100.0

Table 4-17 Continuing Education – Time Since Last Attendance

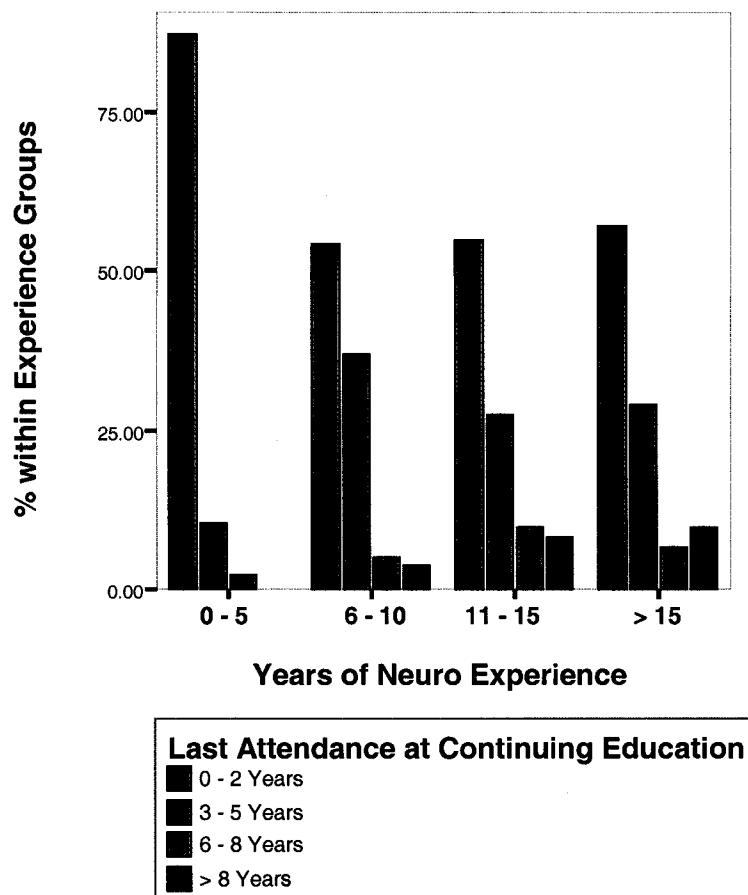


Figure 4-9 Continuing Education – Time Since Last Attendance

4.1.5 Team Environment (Q 13)

The therapists surveyed were asked in question 13 to identify if they worked or consulted with other healthcare professionals to recommend or provide further medical management of spasticity beyond their occupational or physical therapy interventions. Interactions with other healthcare providers may indirectly or directly provide experiential learning opportunities to therapists – and so the profile of interaction with other consulting healthcare professionals is of interest.

Of the 401 therapists who responded to Q13, 46 identified that they did not consult with others and 355 identified that they did consult other healthcare professionals. The overall response profile for “health care professionals consulted” is presented in Figure 4-10. Respondents who selected the ‘other’ category tended to provide responses that could be grouped to include healthcare professionals such as Pharmacist, Speech Language Pathologist and the Equipment Specialist.

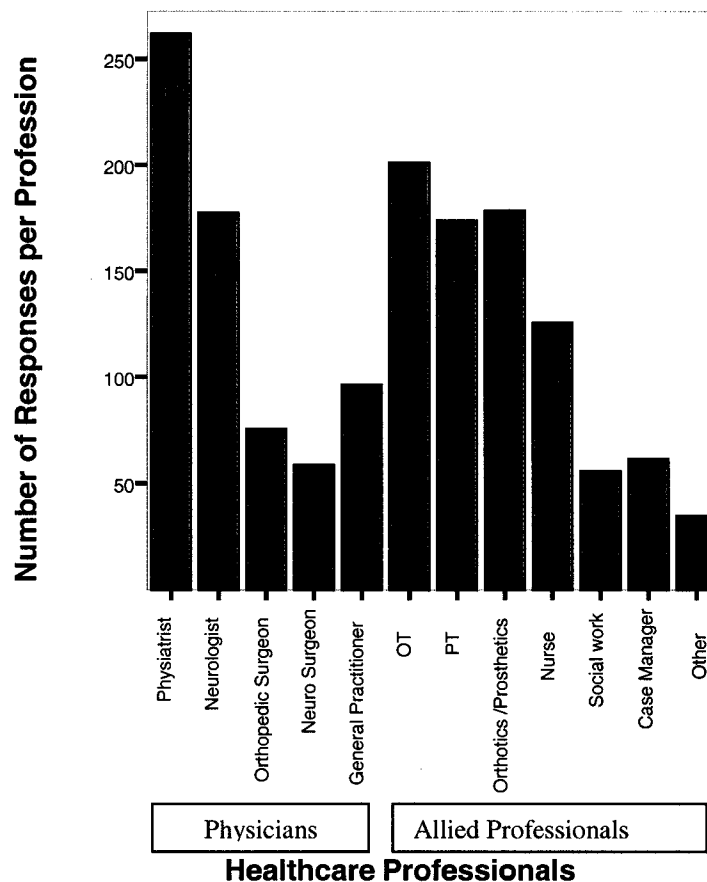


Figure 4-10 Team Environment – Consulting Healthcare Professionals

To gain insight into where the interactions with other health care professionals treating clients experiencing spasticity may be taking place, the overall response profile shown in Figure 4-10 was delineated in terms of the respondents' professional designation. Table 4-18 and Figure 4-11 shows this delineation of consultation with other healthcare professionals. As stated earlier for Table 4-6, respondents had the option for multiple responses so the quoted percentages are with respect to the number of surveys with an answer for the question.

				OT/PT		Total
				OT	PT	
Team Members	Physician Specialties	Physiatrist	Count	112	150	262
			Column %	80.6	69.4	73.8
		Neurologist	Count	62	116	178
			Column %	44.6	53.7	50.1
		Orthopedic Surgeon	Count	26	49	75
			Column %	18.7	22.7	21.1
		Neuro Surgeon	Count	18	40	58
			Column %	12.9	18.5	16.3
		General Practitioner	Count	35	61	96
			Column %	25.2	28.2	27.0
	Allied Professionals	Occupational Therapy	Count	49	152	201
			Column %	35.3	70.4	56.6
		Physical Therapy	Count	105	69	174
			Column %	75.5	31.9	49.0
		Orthotist / Prosthetist	Count	46	133	179
			Column %	33.1	61.6	50.4
		Nurse	Count	57	69	126
			Column %	41.0	31.9	35.5
		Social Worker	Count	27	29	56
			Column %	19.4	13.4	15.8
		Case Manager	Count	26	35	61
			Column %	18.7	16.2	17.2
		Other	Count	15	20	35
			Column %	10.8	9.3	9.9
Total			Count	139	216	355
			Column %	100.0	100.0	100.0

Table 4-18 Team Environment – OT/PT Consultation with Healthcare Professionals

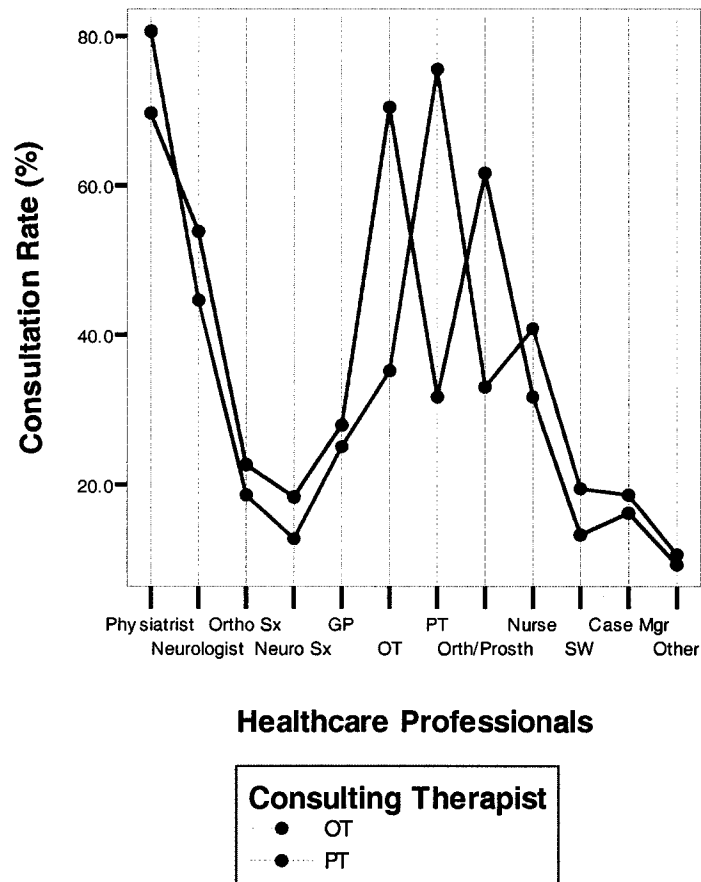


Figure 4-11 Team Environment – OT/PT Consultation with Healthcare Professionals

If one looks at the consultation patterns within the OT and PT groups separately, it can be seen that they refer to the opposite specialty at the same rate ($\chi^2 = .316$, $df=1$, $sig=.596$) and within their own specialty at the same rate ($\chi^2 = .279$, $df=1$, $sig=.622$). There is no apparent pattern shift between OT and PT for consulting with other healthcare professionals with one significant difference: PT tends to consult with Orthotics/Prosthetics more than OT does ($\chi^2 = 13.619$, $df=1$, $sig=.0002$). It is not surprising that Orthotics and Prosthetics was consulted more frequently by PT given that physical therapists' scope of practice often involves lower extremity bracing in conjunction with the Orthotics or Prosthetics professional.

				Practice Location		Total	
				Location - Rural	Location - Urban		
Team Members	Physician Specialties	Physiatrist	Count	34	228	260	
			Column %	61.8	76.5	74.1	
		Neurologist	Count	22	156	176	
			Column %	40.0	52.3	50.1	
		Orthopedic Surgeon	Count	10	65	75	
			Column %	18.2	21.8	21.4	
		Neuro Surgeon	Count	7	50	57	
			Column %	12.7	16.8	16.2	
		General Practitioner	Count	24	71	95	
			Column %	43.6	23.8	27.1	
		Occupational Therapy	Count	27	173	199	
			Column %	49.1	58.1	56.7	
	Allied Professionals	Physical Therapy	Count	31	142	171	
			Column %	56.4	47.7	48.7	
		Orthotist / Prosthetist	Count	24	154	177	
			Column %	43.6	51.7	50.4	
		Nurse	Count	16	109	125	
			Column %	29.1	36.6	35.6	
		Social Worker	Count	6	49	55	
			Column %	10.9	16.4	15.7	
		Case Manager	Count	6	55	61	
			Column %	10.9	18.5	17.4	
		Other	Count	5	30	34	
			Column %	9.1	10.1	9.7	
Total				Count	55	298	351
				Column %	100.0	100.0	100.0

Table 4-19 Team Environment – Healthcare Professional Consultation and Practice Location

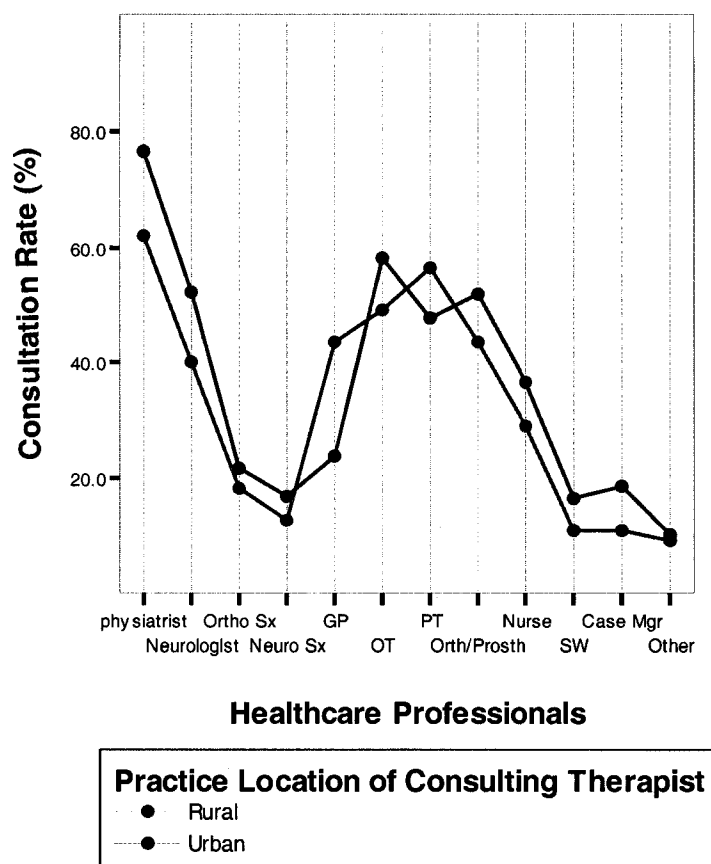


Figure 4-12 Team Environment – Healthcare Professional Consultation and Practice Location

Figure 4-12 (and Table 4-19) shows that the pattern of consultation with health care professionals remains relatively the same between rural and urban practice locations. The only significant difference found with a Chi-square analysis is with respect to General Practitioner consultations. In the rural setting there is an increased consultation rate with the General Practitioner ($\chi^2=7.977$, $df=1$, $sig.=.005$). Access to services may be the simple explanation for this change in physician consultation pattern (i.e., more physician specialties are located in the urban setting).

To investigate whether there is a difference in healthcare consultation pattern among therapists with varying caseloads of clients experiencing spasticity, Figure 4-13 shows

the consultation pattern among the four different caseload delineations. At first glance, it appears that therapists with a caseload of less than 25% of clients experiencing spasticity show a different pattern of referral. However, further analysis reveals no statistical difference in the proportions between the four different caseload group descriptors with one exception: referral to the orthopedic surgeon. Therapists with a caseload of less than 50% of clients experiencing spasticity refer less often to the orthopedic surgeon than the therapists with caseloads with greater than 50% ($\chi^2 = 8.099$, $df=3$, $sig=.044$).

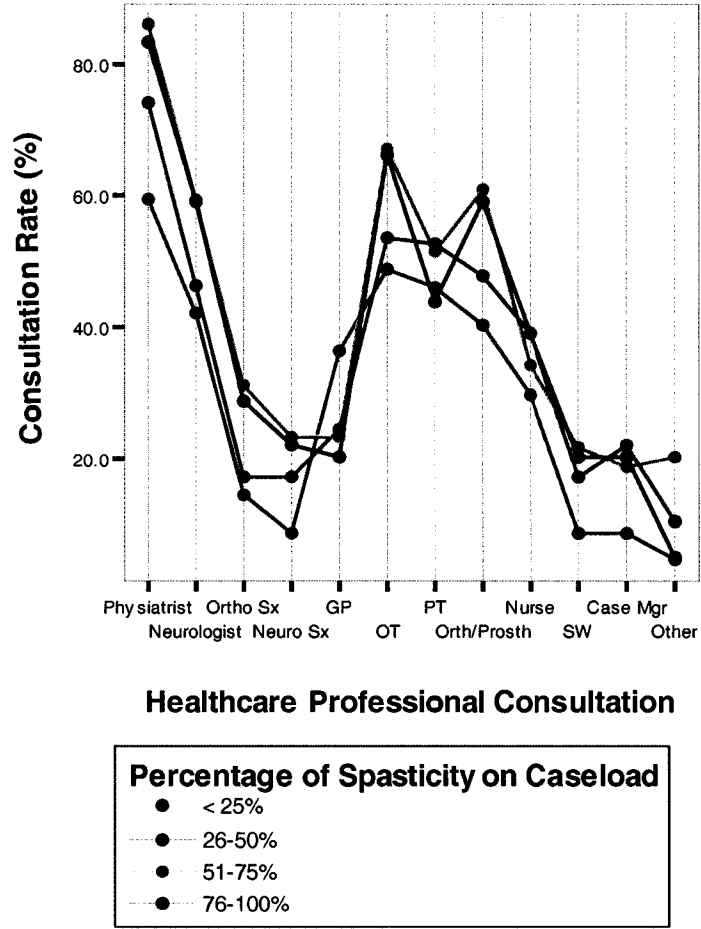


Figure 4-13 Team Environment – Healthcare Professional Consultation and Caseload

4.1.6 Referral Pattern (Q 14, 16)

It was anticipated that both OTs and PTs would identify physician specialties as a frequently consulted healthcare professional(s) in the area of spasticity management. Therapists were asked in Q14 if they ever recommend that a client be referred to a physician for further medical management of spasticity as an adjunct to occupational or physical therapy. Of the 397 therapists who responded to the question, 67 respondents (16.9%) checked that they do not refer and 330 (83.1%) reported that they did refer to physicians for further medical management. For those 330 respondents who reported that they did refer to physicians, they were then asked to identify all areas where they (OT/PT) provided recommendation(s). Table 4-20 presents the response pattern. The majority of respondents identified that they provided recommendations to their physicians in the area of oral medications and chemodenervation (e.g., Alcohol, BOTOX®, MYOBLOC™, and/or Phenol injections). No statistically significant differences in proportions were found between OT and PT referral patterns for medical management using the Chi-square analysis.

			OT	PT	Total
Adjunct Referral	Oral Medications	Count	105	168	273
		Column %	82.7	84.0	83.5
	Chemodenervation	Count	104	161	265
		Column %	81.9	80.5	81.0
	ITB	Count	65	79	144
		Column %	51.2	39.5	44.0
	Surgery	Count	29	50	79
		Column %	22.8	25.0	24.2
	Other	Count	4	11	15
		Column %	3.1	5.5	4.6
Total		Total Responses	307	469	776
		Survey Count	127	200	327
		Column %	100.0	100.0	100.0

Table 4-20 Referral Pattern – Adjunct Management Recommendations

In order to capture the timing of the referral patterns, the respondents were asked in Q16 to identify ‘on average, how long will you treat a client before asking the attending physician or consultant for a medication review of the spasticity treatment?’ The frequencies for the average length of time for referral for medication review of the 387 who responded, are shown in Figure 4-14 below. There were only 8, 6, and 4 respondents respectively in the 6 month, 1-year and greater than 1 year options.

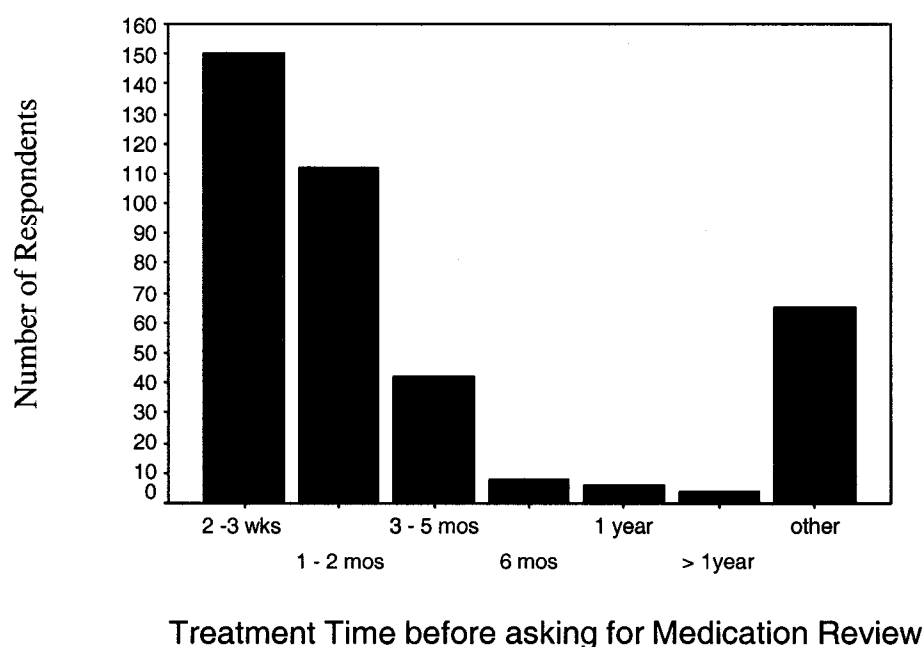


Figure 4-14 Referral Pattern – Treatment Time Before Medication Review

For the 65 respondents (16%) who selected ‘other’, the majority of respondents in this category were physical therapists (52 PTs versus 13 OTs) and the written responses tended to fall into four categories: ‘less than a week’; ‘it depends on several factors’; ‘I have never asked for a review’; and ‘I disagree with medical interventions’. For both OTs and PTs the relative order of the referrals within the first two options (2-3 weeks and

1-2 months) remains the same, however the PTs refer within the first 2-3 weeks at a significantly higher proportion than do OTs ($\chi^2 = 4.189$, $df=1$, $sig.=.041$). There is also a significantly higher proportion of PTs choosing the 'other' category than OTs as previously described ($\chi^2 = 9.360$, $df=1$, $sig.=.002$).

4.1.7 Relationship with Physician (Q 15, 17)

The next survey question that explored the effect on a therapists' referral pattern addressed the therapists' relationship with the physician (Q15). The therapists were asked to select one response which best described the working relationship 'with your clients' physician for spasticity management'. Table 4-21 presents the responses.

			OT	PT	Total
Relationship with Physician	Collaborative	Count	85	139	224
		Column %	55.9	58.4	57.4
	Physician Directed Management	Count	44	45	89
		Column %	28.9	18.9	22.8
	Therapist Directed Management	Count	4	12	16
		Column %	2.6	5.0	4.1
	No Working Relationship	Count	19	42	61
		Column %	12.5	17.6	15.6
Total		Survey Count	152	238	390
		Column %	100.0	100.0	100.0

Table 4-21 Therapist – Physician Relationship

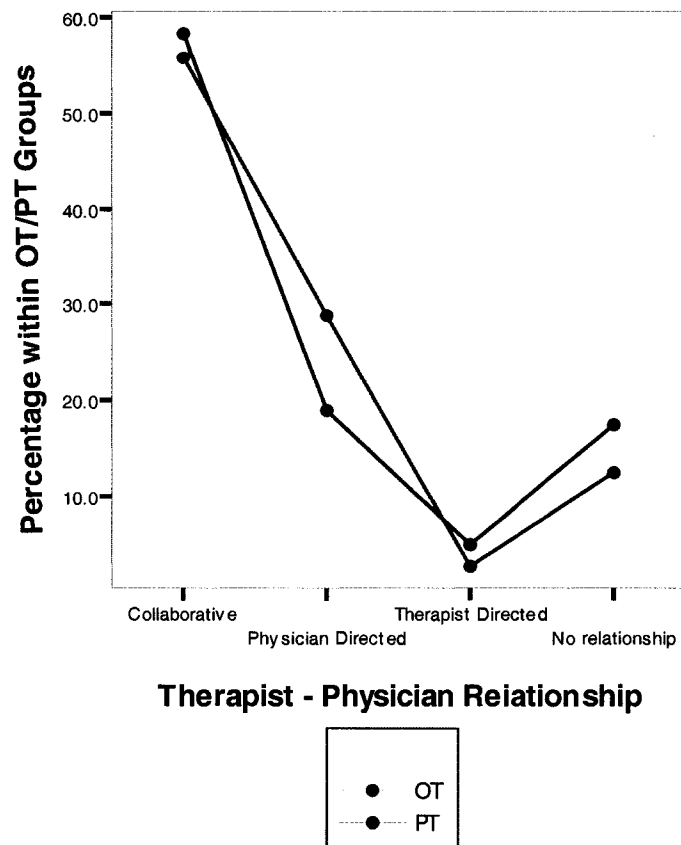


Figure 4-15 Therapist-Physician Relationship

Figure 4-15 displays the response patterns of Q15 between the OT and PT groups as tabulated above in Table 4-21. The only significant difference between the OT and PT response profile existed in the ‘Physician Directs Management’ group. The OT group has a significantly higher proportion reporting that the physician directs management ($\chi^2 = 4.085$, $df = 1$, $sig. = .043$).

In order to capture if there were any uncertainties in the therapist-physician relationship, therapists were asked in question 17 if they were ‘hesitant to recommend that a client be referred to a physician for further medical management of spasticity’. Of the 395 who responded to the question, 100 (25.3%) were hesitant to refer and 295 (74.7%) recorded

that they were not hesitant to refer. Of the 100 respondents who were hesitant to refer, 31 were OTs (20% of the OT group) and 69 were PTs (28% of the PT group); the proportion of therapists reporting a hesitancy to refer was not significantly different between OT and PT groups ($\chi^2 = 2.376$, $df = 1$, $sig.=0.123$). To further explore the therapists' hesitancy to refer, Table 4-22 and Figure 4-16 present the correlation between the respondents' relationship with their clients' physician and their hesitancy (or not) to refer.

			Hesitancy to Refer to a Physician		Total
			No	Yes	
Therapist Relationship with the Client's Physician	Collaborative	Count	184	37	221
		Column %	63.9	38.9	57.7
	Physician Directed	Count	69	20	89
		Column %	24.0	21.1	23.2
	Therapist Directed	Count	7	8	15
		Column %	2.4	8.4	3.9
	No Relationship	Count	28	30	58
		Column %	9.7	31.6	15.1
Total	Count	288	95	383	
	Column %	100.0	100.0	100.0	

Table 4-22 Therapist-Physician Relationship and Hesitancy to Refer

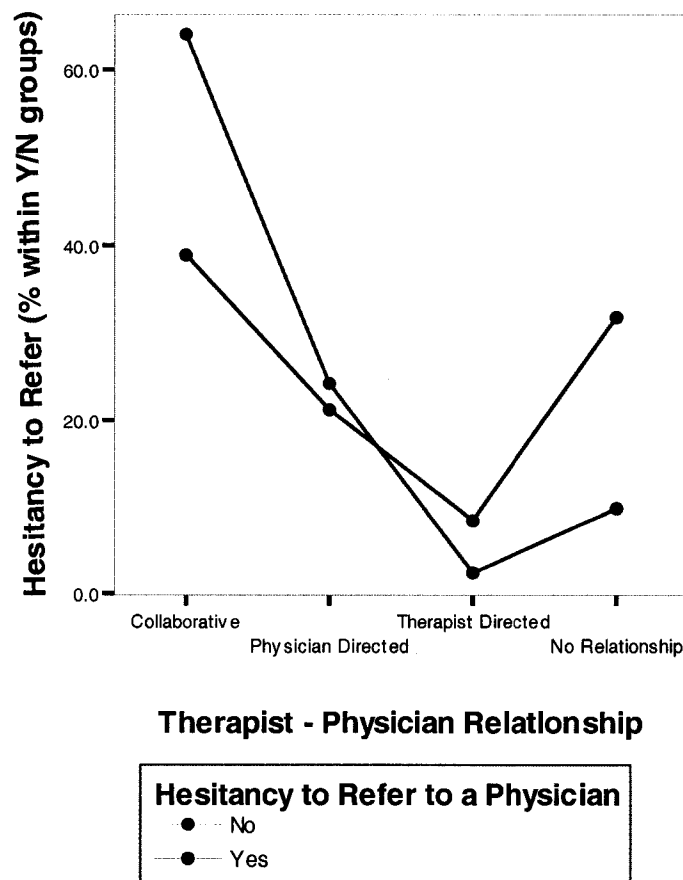


Figure 4-16 Therapist-Physician Relationship and Hesitancy to Refer

The data shown in Table 4-22 and Figure 4-16 can be used to check if the therapist-physician relationship profile is different for those who reported that they were hesitant to refer compared to those who were not hesitant to refer. A Chi-square analysis shows that indeed there is a change in the profile of all relationship categories with the exception of 'Physician Directed' relationship ($\chi^2 = 0.265$, $df = 1$, $sig.=0.606$). A greater proportion of therapists who were **not** hesitant to refer had a collaborative relationship with the client's physician compared to those therapists who were hesitant ($\chi^2 = 7.688$, $df = 1$, $sig.=0.006$). On the other hand, therapists who were hesitant to refer reported having the 'Therapist

Directed' ($\chi^2 = 6.634$, $df = 1$, $sig.=0.010$) and 'No Relationship' ($\chi^2 22.482$, $df = 1$, $sig.=0.000002$) at greater proportions.

Therapists who did respond that they were hesitant to refer were then asked to check any/all statements which best described their hesitancy. As can be seen in Figure 4-17, the most common chosen explanation for the therapists' hesitancy to refer rationale is their uncertainty concerning the physician's experience with spasticity. There was no significant difference between the OT and PT proportions for the various rationales to describe their hesitancy to refer.

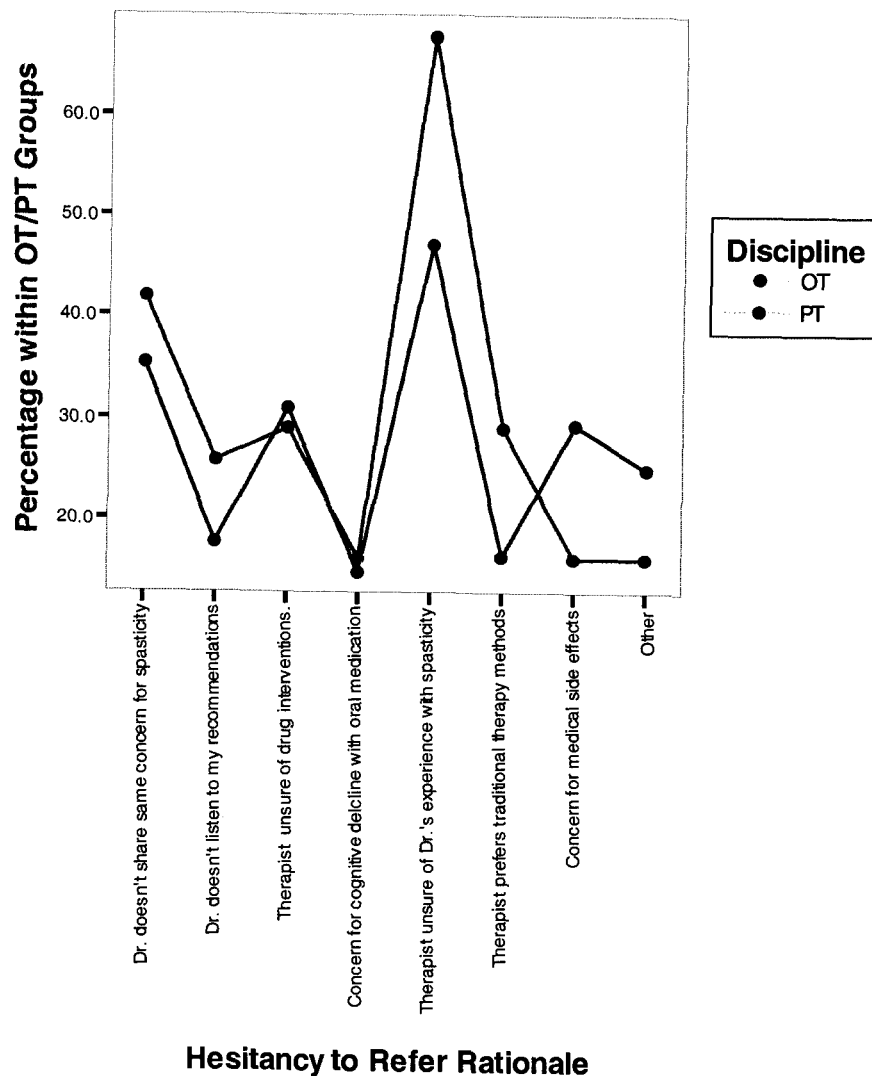


Figure 4-17 Therapist-Physician Relationship – Hesitancy to Refer Rationale

Also of interest, the 'other' category in Figure 4-17 contained written responses which tended to fall into three categories: lack of education regarding medication on behalf of the therapist ("Medication is their field, not mine"), uncertainty regarding spasticity recommendations ("I'm not sure at what point of spasticity a referral to a physician is appropriate") and concern with medical management possibilities ("I fear 'aggressive' and 'irreversible' interventions!").

Finally, investigation into how the years of neurorehabilitation experience may impact upon the hesitancy to refer rationale is presented in Figure 4-18.

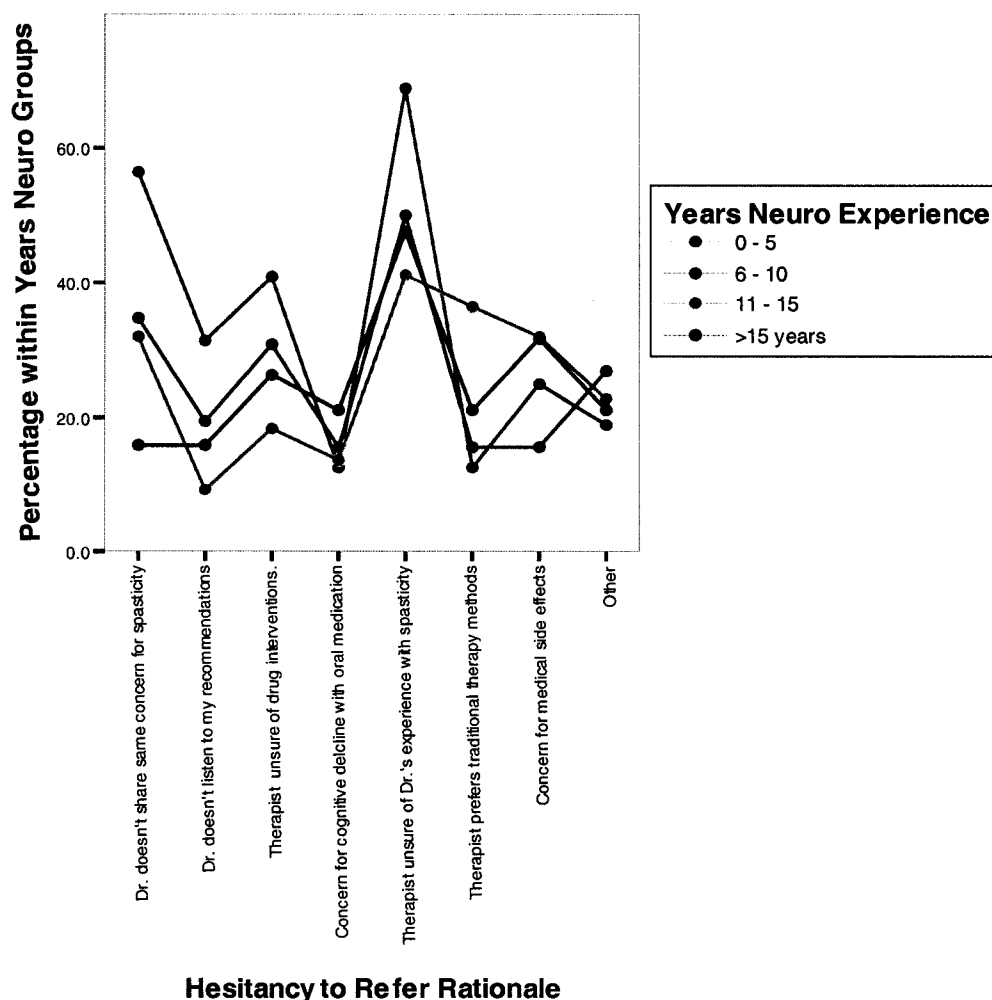


Figure 4-18 Therapist-Physician Relationship – Hesitancy to Refer and Years Neurorehabilitation Experience

According to the Chi-square analysis, there are no significant differences among the proportion of therapists from the four different years of neurorehabilitation experience groups and the rate at which they reported hesitancy rationales. However, if the group of 0-5 years of neurorehabilitation experience is compared to the sum of the other three experience groups (6 – >15 years of neurorehabilitation experience), there is a

statistically significant difference in the proportion at which the 0-5 group selected the 'Physician does not share the same concern for spasticity' rationale. The least experienced therapists selected this rationale at a higher proportion than the more experienced therapists ($\chi^2=.4.440$, $df=1$, $sig. =.035$).

This completes the description of the survey respondent characteristics. In subsequent sections a subset of these characteristics will be investigated for their potential influence on therapeutic decision-making for spasticity management.

4.2. Trends in Therapeutic Intervention Decisions

In the following subsections the survey responses to questions regarding the therapeutic management illustrate the profile of the current trends in three areas:

- therapeutic management techniques used with clients with upper motor neuron syndrome – specifically spasticity (Q30, column one),
- client factors which influenced the clinical reasoning for selected therapeutic interventions for spasticity management (Q31), and
- therapist-related factors that affected the selection of therapeutic interventions for spasticity management (Q32).

Following the method outlined in section 3.4, shifts in patterns of responses to these three questions will be investigated according to the respondents' relevant practice profile groupings from section 4.1. For the purposes of this analysis, the focus has been restricted to the following major descriptors from the therapists' practice profile: discipline (OT/PT), years of neuro rehabilitative experience, percentage of caseload with

spasticity, academic preparation, continuing education experience, experience with healthcare consultants, and practice location.

4.2.1 Therapeutic Management Techniques (Q30)

Survey Q30 inquired about the therapeutic management techniques employed by the therapist to manage a client with upper motor neuron (UMN) syndrome. The analysis completed for this thesis focussed on the question subset which inquired about spasticity. The respondents were asked to review a listing of 23 therapeutic interventions (plus an 'other, please specify' written response option) and select the intervention(s) that best reflected the methods they employed to address the positive symptoms (e.g., spasticity). Figure 4-19 presents the overall response pattern from the 382 therapists who selected choices for spasticity management in Q30. The therapeutic intervention choices on the survey represent a range of interventions therapists may use with their clients experiencing spasticity. The range includes biomechanical approaches (e.g., stretching, seating/positioning, strengthening, splinting, casting), historical neuro remediation approaches (e.g., NDT, PNF), emerging practice techniques and approaches (e.g., CIMT, motor learning, neurodynamics, kinesio taping), discipline specific retraining (e.g., ADL, gait retraining) and compensation approaches (e.g., equipment provision, bracing).

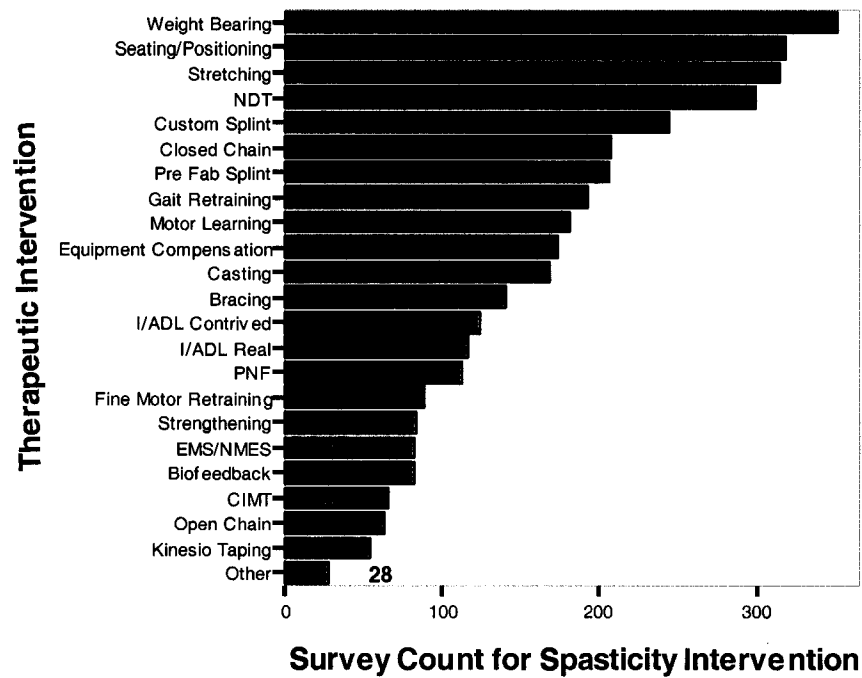


Figure 4-19 Therapeutic Intervention Profile – Spasticity

4.2.1.1 OT / PT Therapeutic Intervention Profile

Figure 4-20 illustrates the breakdown of therapeutic intervention choices shown in Figure 4-19 into OT and PT discipline groupings. Given that there are areas of professional training that are common and areas that are distinct between OT and PT, Figure 4-20 helps illustrate where the disciplines share common approaches and where there is a divide into more discipline specific work (i.e., gait, bracing for PT and I/ADL, splinting for OT).

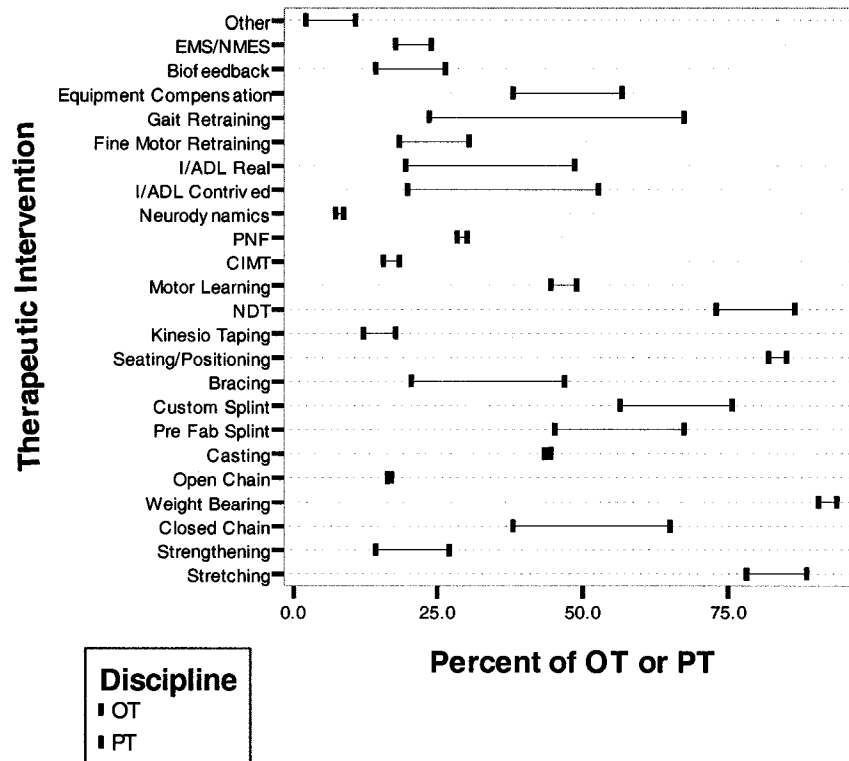


Figure 4-20 Therapeutic Intervention Profile for Spasticity – OT/PT

Another way to make sense of Figure 4-20 is to catalogue the percentages within each discipline into rankings from most selected (1) to least selected (24) – this overall ranking order is shown in Table 4-23.

Therapeutic Intervention – Spasticity	Selection Ranking within Group OT/PT	
	OT	PT
Weightbearing	1	1
Stretching	2	3
NDT	3	4
Seating and Positioning	4	2
Splinting – Custom-Made	5	7
Splinting – Pre-Fabricated	6	10
Adaptive Equipment Compensation	7	12
ADL / IADL Retraining in Contrived Environments	8	17
ADL / IADL Retraining in Real Environments	9	18
Casting (Serial & Bivalve)	10	11
Motor Learning	11	8
Closed Chain activities	12	6
Fine Motor Retraining	13	19
PNF	14	13
Gait retraining	15	5
Bracing	16	9
KinesioTaping	17	22
EMS/NMES	18	16
Open Chain Activities	19	21
Constraint Induced Therapy	20	20
Strengthening	21	14
Biofeedback	22	15
Neurodynamics	23	24
Other (please specify below):	24	23

Table 4-23 Therapeutic Intervention for Spasticity Ranking – OT/PT

While the relative rank ordering within a discipline may change, the top four selected therapeutic interventions for both OT and PT are the same (weightbearing, seating/positioning, stretching, and NDT). If you expand to view the top 11 ranked therapeutic interventions, there is also a similarity in frequency of selection of techniques between the OT and PT respondents (pre-fabricated splinting, custom splinting, casting

and motor learning). However, it is also evident that there are distinct differences in ranking with respect to some areas of discipline expertise. The educational curriculum content and scope of professional practice tends to support the distinct pattern choices of close chained activities, gait and bracing for PTs, and I/ADL in contrived or real environments, and adaptive equipment training for OTs. The written response data recorded from the 'other' category came mostly from PT surveys and could be considered in 2 groups – Brunnstrum techniques and other modality choices (e.g., ultrasound).

Since the therapeutic management of spasticity is only one aspect of the UMN syndrome, it may be treated in isolation, but it may also be affected by the management of the other UMN challenges (negative symptoms and rheological changes) and how therapists approach the functional retraining aspect. Given this possible interplay, it was of interest to see if there was a difference in the rank ordering of these management areas and the therapeutic selection choices – given the close similarity in their choices for spasticity (i.e., Do OTs and PTs have a similar ranking for selecting interventions in all areas of UMN management, or is spasticity unique in this therapeutic intervention profile?). Tables Table 4-24, 4-25 and 4-26 show the percentages within each discipline converted into rankings from most selected (1) to least selected (24) for three therapeutic management areas (negative symptoms, rheological changes and functional retraining).

Therapeutic Intervention – Negative Symptoms	Selection Ranking within Group OT/PT	
	OT	PT
Strengthening	1	1
Fine Motor Retraining	2	11
NDT	3	5
ADL / IADL Retraining in Contrived Environments	4	14
Seating and Positioning	5	9
Adaptive Equipment Compensation	6	12
ADL / IADL Retraining in Real Environments	7	16
Weightbearing	8	4
Motor Learning	9	6
Closed Chain Activities	10	3
PNF	11	8
Open Chain Activities	12	7
Constraint Induced Therapy	13	15
Kinesio Taping	14	19
Gait Retraining	15	2
EMS/NMES	16	10
Stretching	17	21
Splinting – Custom Made	18	18
Splinting – Pre-Fabricated	19	20
Biofeedback	20	17
Bracing	21	13
Neurodynamics	22	23
Other (please specify below)	23	22
Casting (serial and bivalve)	24	24

Table 4-24 Therapeutic Intervention for Negative Symptoms Ranking – OT/PT

Therapeutic Intervention – Rheological Changes	Selection Ranking within Group OT/PT	
	OT	PT
Stretching	1	1
Seating and Positioning	2	2
Splinting – Custom Made	3	5
Splinting – Pre-Fabricated	4	11
Adaptive Equipment Compensation	5	10
NDT	6	8
Weightbearing	7	3
ADL / IADL Retraining in Contrived Environments	8	19
ADL / IADL Retraining in Real Environments	9	18
Casting (serial and bivalve)	10	12
Fine Motor Retraining	11	17
Motor Learning	12	13
Strengthening	13	6
Closed Chain Activities	14	7
PNF	15	15
Gait Retraining	16	4
Bracing	18	9
Open Chain Activities	17	14
Kinesio Taping	19	21
EMS/NMES	20	16
Constraint Induced Therapy	21	20
Biofeedback	22	24
Neurodynamics	23	22
Other (please specify below)	24	23

Table 4-25 Therapeutic Intervention for Rheological Changes Ranking – OT/PT

Therapeutic Intervention – Functional Retraining	Selection Ranking within Group OT/PT	
	OT	PT
ADL / IADL Retraining in Contrived Environments	1	8
ADL / IADL Retraining in Real Environments	2	7
Adaptive Equipment Compensation	3	9
Fine Motor Retraining	4	11
NDT	5	6
Motor Learning	6	2
Seating and Positioning	7	10
Strengthening	8	5
Weightbearing	9	3
Stretching	10	14
Closed Chain Activities	11	4
Open Chain Activities	12	12
Gait Retraining	13	1
Constraint Induced Therapy	14	13
PNF	15	16
Splinting – Custom Made	16	18
Splinting – Pre-Fabricated	17	21
EMS/NMES	18	17
Kinesio Taping	19	20
Neurodynamics	20	22
Biofeedback	21	19
Bracing	22	15
Casting	23	24
Other (please specify below)	24	23

Table 4-26 Therapeutic Intervention for Functional Retraining Ranking – OT/PT

While there are some similarities between OT and PT for the top therapeutic intervention choices within the “negative symptoms” (Table 4-24) and “rheological changes” profiles (Table 4-25), there is not the consistency of ranking between OT and PT for the top 10 as seen within therapeutic intervention management choices for “spasticity” (Table 4-23). The large differences seen within the top 10 rankings for Tables 4-24 and 4-25 could simply reflect the specific training base unique to OT and PT (i.e., ADL/IADL and fine

motor activities for OT and gait retraining, closed chained activities for PT etc.), and not necessarily the effectiveness of the intervention. The “functional retraining” rankings (Table 4-26) reflect the differences that one might expect to see given the different scope of therapeutic practice between the disciplines.

Thus, it does appear that there are differences between OT and PT for other associated UMN challenges (i.e., negative symptoms, rheological changes and functional retraining), while in contrast, the therapeutic management of spasticity has a uniquely consistent profile of intervention selection between OTs and PTs in comparison to the other three category comparisons.

4.2.1.2 Analysis of Influencing Factors on OT

To investigate what may be the contributing influences to these rankings of therapeutic interventions for spasticity within the OT discipline, Table 4-27, 4-28 and 4-29 present the OT respondents’ therapeutic intervention profile with respect to selected influencing factors. These tables contain the data that is used to create Figure 4-21.

Figure 4-21 presents the interaction between the therapeutic interventions to manage spasticity (from Q30) and influencing factor groups of OT respondents. The figure graphs the percentage the interventions selected by the respondents from within each factor group.

Influencing Factors		Therapeutic Interventions							
		Stretch- ing	Strength -ening	Closed Chain	Weight Bearing	Open Chain	Casting	Pre Fab Splint	Custom Splint
Years Neuro Experience	0 - 5	92.9%	7.1%	28.6%	85.7%	21.4%	14.3%	60.7%	57.1%
	6 - 10	91.7%	18.8%	50.0%	97.9%	27.1%	52.1%	72.9%	87.5%
	11 - 15	88.9%	16.7%	36.1%	94.4%	5.6%	55.6%	72.2%	77.8%
	>15	80.6%	11.1%	30.6%	94.4%	11.1%	47.2%	61.1%	72.2%
Practice Location	- Rural	93.1%	6.9%	31.0%	93.1%	20.7%	24.1%	55.2%	62.1%
	- Urban	87.3%	16.1%	39.8%	94.1%	16.9%	49.2%	69.5%	78.8%
Caseload % Spasticity	< 25%	85.0%	17.5%	30.0%	90.0%	17.5%	37.5%	67.5%	72.5%
	26-50%	93.9%	7.6%	34.8%	95.5%	16.7%	39.4%	68.2%	74.2%
	51-75%	80.8%	15.4%	50.0%	100%	7.7%	69.2%	65.4%	80.8%
	76-100%	84.6%	38.5%	46.2%	92.3%	38.5%	38.5%	69.2%	76.9%
Academic Preparation	No	92.9%	7.1%	28.6%	92.9%	21.4%	64.3%	64.3%	78.6%
	Yes	87.9%	15.2%	39.4%	94.7%	16.7%	42.4%	68.2%	75.0%
Continuing Education Attendance	No	95.0%	10.0%	40.0%	95.0%	15.0%	40.0%	65.0%	65.0%
	Yes	87.4%	15.0%	37.8%	94.5%	17.3%	45.7%	68.5%	78.0%
Team Member Collaboration	No	93.3%	33.3%	53.3%	80.0%	40.0%	40.0%	66.7%	66.7%
	Yes	87.9%	12.1%	36.4%	96.2%	14.4%	45.5%	68.2%	77.3%

% = the % within each of the influencing factor groups that selected the intervention for spasticity

Results in bold font indicated a significant difference between groups (Chi-square $p \leq 0.05$)

Table 4-27 Therapeutic Interventions for Spasticity – Influencing Factors – OT – (Part I)

Influencing Factors		Therapeutic Interventions							
		Bracing	Seating	Kinesio Taping	NDT	Motor Learn	CIMT	PNF	Neuro-dynamics
Years Neuro Experience	0 - 5	17.9%	92.9%	14.3%	92.9%	60.7%	10.7%	21.4%	3.6%
	6 - 10	20.8%	87.5%	12.5%	87.5%	45.8%	20.8%	29.2%	8.3%
	11 - 15	22.2%	77.8%	25.0%	91.7%	47.2%	16.7%	41.7%	8.3%
	>15	19.4%	83.3%	19.4%	75.0%	27.8%	11.1%	19.4%	8.3%
Practice Location	Rural	13.8%	79.3%	6.9%	96.6%	41.4%	13.8%	24.1%	13.8%
	Urban	22.0%	86.4%	21.2%	83.9%	44.9%	16.1%	30.5%	6.8%
Caseload % Spasticity	< 25%	10.0%	85.0%	5.0%	87.5%	37.5%	10.0%	20.0%	5.0%
	26-50%	21.2%	86.4%	15.2%	87.9%	47.0%	16.7%	25.8%	4.5%
	51-75%	26.9%	84.6%	26.9%	96.2%	46.2%	19.2%	30.8%	7.7%
	76-100%	23.1%	84.6%	53.8%	61.5%	53.8%	15.4%	61.5%	23.1%
Academic Preparation	No	21.4%	71.4%	14.3%	78.6%	35.7%	7.1%	7.1%	.00
	Yes	20.5%	87.1%	18.2%	87.9%	45.5%	16.7%	31.1%	7.6%
Continuing Education Attendance	No	20.0%	75.0%	20.0%	90.0%	45.0%	5.0%	20.0%	.00
	Yes	20.5%	86.6%	17.3%	85.8%	44.1%	17.3%	29.9%	8.7%
Team Member Collaboration	No	20.0%	93.3%	20.0%	86.7%	53.3%	20.0%	20.0%	20.0%
	Yes	20.5%	84.1%	17.4%	86.4%	43.2%	15.2%	29.5%	6.1%

% = the % within each of the influencing factor groups that selected the intervention for spasticity

Results in **bold** font indicated a significant difference between groups (Chi-square $p \leq 0.05$)

Table 4-28 Therapeutic Interventions for Spasticity – Influencing Factors – OT – (Part II)

Influencing Factors		Therapeutic Interventions							
		I/ADL Contrived	I/ADL Real	FM Retrain	Gait	Equip Compens	Bio- feedback	EMS /NMES	Other
Years Neuro Experience	0 - 5	53.6%	50.0%	28.6%	21.4%	60.7%	17.9%	10.7%	3.6%
	6 - 10	56.3%	45.8%	31.3%	31.3%	54.2%	16.7%	20.8%	2.1%
	11 - 15	55.6%	55.6%	33.3%	22.2%	58.3%	8.3%	22.2%	2.8%
	>15	44.4%	44.4%	27.8%	16.7%	55.6%	13.9%	13.9%	.00
Practice Location	Rural	44.8%	37.9%	34.5%	13.8%	51.7%	24.1%	13.8%	.00
	Urban	55.1%	51.7%	29.7%	26.3%	57.6%	11.9%	18.6%	2.5%
Caseload % Spasticity	25%	50.0%	45.0%	20.0%	17.5%	62.5%	12.5%	17.5%	2.5%
	26-50%	48.5%	42.4%	27.3%	24.2%	51.5%	13.6%	10.6%	3.0%
	51-75%	65.4%	65.4%	38.5%	26.9%	57.7%	11.5%	26.9%	.00
	76-100%	61.5%	61.5%	61.5%	30.8%	61.5%	23.1%	23.1%	.00
Academic Preparation	No	50.0%	50.0%	.00	21.4%	28.6%	.00	.00	7.1%
	Yes	53.0%	48.5%	34.1%	23.5%	59.8%	15.9%	19.7%	1.5%
Continuing Education Attendance	No	60.0%	55.0%	25.0%	15.0%	55.0%	10.0%	5.0%	.0%
	Yes	52.0%	48.0%	31.5%	25.2%	57.5%	15.0%	19.7%	2.4%
Team Member Collaboration	No	66.7%	53.3%	40.0%	26.7%	73.3%	26.7%	6.7%	.00
	Yes	51.5%	48.5%	29.5%	23.5%	55.3%	12.9%	18.9%	2.3%

% = the % within each of the influencing factor groups that selected the intervention for spasticity

Results in **bold** font indicated a significant difference between groups (Chi-square $p \leq 0.05$)

Table 4-29 Therapeutic Interventions for Spasticity – Influencing Factors – OT – (Part III)

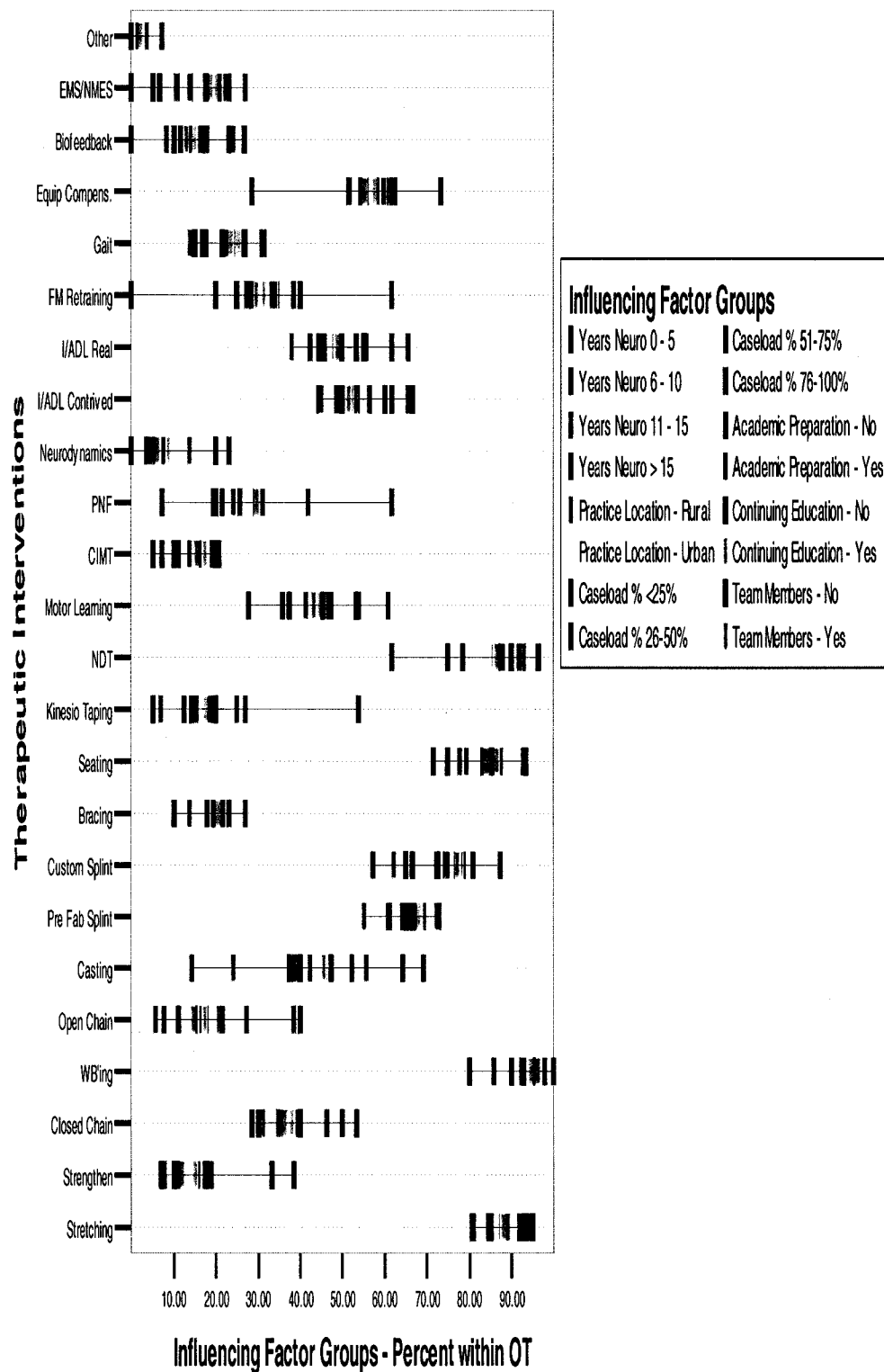


Figure 4-21 Therapeutic Interventions for Spasticity – Influencing Factors – OT

The graphic presentation in Figure 4-21 might suggest that there are factors that greatly influence the selection of particular therapeutic interventions for spasticity among OTs. To check if observed differences in the response rate for a particular therapeutic intervention were statistically significant, Chi-square analyses were performed within each of the separate influencing factor groups. Please note that the analyses completed for academic preparation and continuing education were performed on whether the respondents indicated yes or no to these questions, and not on the different levels of training within the variable.

In Figure 4-21 it appears that there may be some differences between groups and the use of the skilled techniques related to years of neurorehabilitation experience. The more experienced therapists tended to select intervention techniques that have been in the therapeutic repertoire for a longer period of time (and often require post-graduate training or on site training – NDT, PNF, Splinting and Casting) and the therapists with fewer years of neuro experience are using motor learning more frequently than the most experienced therapists. Motor learning is a more recent addition to the therapeutic repertoire. However, there were no significant differences found between the different years of neuro experience groups and the intervention selection for spasticity with a Chi-square analysis.

Figure 4-21 might suggest that there is a difference between the rural and urban therapists in terms of selection of casting as an intervention choice. While there was a trend for the more urban OTs than expected to select casting and the rural counterparts selected at a

rate less than expected, the Chi-square analysis found no significant difference between the urbanite and rural OTs in their selection of rates for casting.

The therapists' percentage of caseload did have a significant effect on the selection of spasticity therapeutic interventions with respect to the use of kinesio taping. Table 4-30 shows that therapists who indicated that 76 – 100% of their caseload experiences spasticity selected kinesio taping at a higher rate (O) than expected (E) and the group of therapists who indicated that 0– 25% of their caseload experiences spasticity selected kinesio taping at a lower rate (O) than expected (E). Another trend between these two groups was seen with respect to strengthening, though the difference was not found to be significant. It should be noted that while there was an effect found with the caseload percentage, the actual number of respondents selecting these interventions was small compared to other interventions and are not indicative of mainstream intervention choices.

	Caseload % 0-25	Caseload % 26 - 50	Caseload % 51- 75	Caseload % 76 - 100	$(.05) \chi^2 = 7.82$ df = 3
Strengthening	O = 7.0 E = 5.8	O = 5.0 E = 9.6	O = 4.0 E = 3.8	O = 5.0 E = 1.9	7.601
Kinesio taping	O = 2.0 E = 7.2	O = 10.0 E = 11.8	O = 7.0 E = 4.7	O = 7.0 E = 2.3	14.539

Table 4-30 Therapeutic Interventions for Spasticity – OT – Caseload % Chi Square

Table 4-31 shows the effect of academic preparation (yes or no) on the selection of therapeutic intervention choices. Therapists who had received some academic preparation selected fine motor retraining at a higher rate (O) than expected (E) compared to those who had no academic preparation for spasticity management.

	Academic Preparation (No)	Academic Preparation (Yes)	$(.05) \chi^2 = 3.84$ df = 1
Fine Motor Retraining	O = 0.0 E = 4.3	O = 45.0 E = 40.7	= 4.773

Table 4-31 Therapeutic Interventions for Spasticity – OT – Academic Preparation Chi Square

There were no trends or significant differences within the responding OT's selection of spasticity therapeutic interventions and the OT's reported continuing education attendance.

	Team Consultation (No)	Team Consultation (Yes)	$(.05) \chi^2 = 3.84$ df = 1
Strengthening	O = 5.0 E = 2.1	O = 16.0 E = 18.9	4.242
Open Chain	O = 6.0 E = 2.6	O = 19.0 E = 22.4	5.193

Table 4-32 Therapeutic Interventions for Spasticity – OT – Continuing Education Chi Square

Table 4-32 shows that the Chi Square analysis found a significant effect between the OT consultation pattern with other healthcare professionals and the selection patterns for strengthening and open chained activities as therapeutic intervention strategies for spasticity. The OTs who did not report having consultations with other healthcare professionals reported (O) a higher than expected (E) selection rate of strengthening and open chain activities than did those OTs who reported team consultations.

4.2.1.3 Analysis of Influencing Factors on PT

To investigate what may be the contributing influences to the rankings of therapeutic interventions on spasticity within the PT discipline, Table 4-33, 4-34 and 4-35 present the

PT respondents' therapeutic intervention profile with respect to selected influencing factors. Again, these tables contain the data that is used to create Figure 4-22.

Influencing Factors		Therapeutic Interventions							
		Stretch- ing	Strength -ening	Closed Chain	Weight Bearing	Open Chain	Casting	Pre Fab Splint	Custom Splint
Years Neuro Experience	0 - 5	75.0%	26.6%	68.8%	87.5%	15.6%	29.7%	45.3%	50.0%
	6 - 10	89.1%	27.3%	67.3%	96.4%	10.9%	36.4%	38.2%	50.9%
	11 - 15	77.1%	22.9%	60.4%	93.8%	20.8%	45.8%	54.2%	66.7%
	>15	72.3%	30.8%	64.6%	87.7%	18.5%	61.5%	44.6%	60.0%
Practice Location	Rural	75.8%	30.3%	60.6%	93.9%	18.2%	24.2%	36.4%	33.3%
	Urban	78.4%	26.6%	65.8%	90.5%	16.1%	46.7%	47.2%	60.8%
Caseload % Spasticity	< 25%	79.5%	21.8%	57.7%	92.3%	14.1%	30.8%	37.2%	43.6%
	26-50%	73.9%	24.6%	68.1%	89.9%	21.7%	43.5%	42.0%	53.6%
	51-75%	77.5%	30.0%	72.5%	97.5%	10.0%	60.0%	55.0%	65.0%
	76-100%	84.4%	37.8%	66.7%	84.4%	17.8%	48.9%	55.6%	73.3%
Academic Preparation	No	73.3%	26.7%	73.3%	93.3%	20.0%	66.7%	53.3%	66.7%
	Yes	79.2%	27.3%	64.8%	90.3%	16.2%	42.6%	45.4%	56.0%
Continuing Education Attendance	No	84.5%	16.9%	64.8%	90.1%	9.9%	32.4%	49.3%	50.7%
	Yes	75.8%	31.7%	65.2%	90.7%	19.3%	49.1%	43.5%	59.0%
Team Member Collaboration	No	66.7%	20.8%	58.3%	87.5%	16.7%	25.0%	25.0%	25.0%
	Yes	79.7%	28.0%	66.2%	90.8%	16.4%	46.4%	47.8%	60.4%

% = the % within each of the influencing factor groups that selected the intervention for spasticity

Results in **bold** font indicated a significant difference between groups (Chi-square $p \leq 0.05$)

Table 4-33 Therapeutic Interventions for Spasticity – Influencing Factors – PT –(Part I)

Influencing Factors		Therapeutic Intervention							
		Bracing	Seating	Kinesio Taping	NDT	Motor Learn	CIMT	PNF	Neuro-dynamics
Years Neuro Experience	0 - 5	40.6%	81.3%	12.5%	67.2%	48.4%	17.2%	39.1%	6.3%
	6 - 10	43.6%	81.8%	12.7%	72.7%	52.7%	23.6%	29.1%	5.5%
	11 - 15	58.3%	85.4%	14.6%	79.2%	45.8%	18.8%	25.0%	14.6%
	>15	47.7%	80.0%	9.2%	75.4%	50.8%	15.4%	26.2%	9.2%
Practice Location	Rural	30.3%	81.8%	12.1%	66.7%	42.4%	18.2%	27.3%	9.1%
	Urban	49.7%	82.4%	12.1%	74.9%	50.3%	18.6%	30.7%	8.5%
Caseload % Spasticity	< 25%	39.7%	69.2%	12.8%	64.1%	44.9%	10.3%	28.2%	5.1%
	26-50%	42.0%	88.4%	11.6%	73.9%	53.6%	21.7%	30.4%	11.6%
	51-75%	60.0%	90.0%	12.5%	90.0%	55.0%	25.0%	35.0%	12.5%
	76-100%	53.3%	88.9%	8.9%	73.3%	44.4%	20.0%	26.7%	6.7%
Academic Preparation	No	53.3%	86.7%	20.0%	73.3%	46.7%	13.3%	33.3%	13.3%
	Yes	47.2%	82.4%	11.6%	73.6%	49.5%	19.0%	30.1%	8.3%
Continuing Education Attendance	No	43.7%	81.7%	9.9%	69.0%	43.7%	9.9%	33.8%	2.8%
	Yes	49.1%	82.0%	13.0%	74.5%	50.9%	22.4%	28.6%	11.2%
Team Member Collaboration	No	29.2%	62.5%	8.3%	62.5%	29.2%	4.2%	25.0%	.00
	Yes	49.3%	84.1%	12.6%	74.4%	50.7%	20.3%	30.9%	9.7%

% = the % within each of the influencing factor groups that selected the intervention for spasticity

Results in **bold** font indicated a significant difference between groups (Chi-square $p \leq 0.05$)

Table 4-34 Therapeutic Interventions for Spasticity – Influencing Factors – PT –(Part II)

Influencing Factors		Therapeutic Interventions							
		I/ADL Contrived	I/ADL Real	FM Retrain	Gait	Equip Compens	Bio- feedback	EMS /NMES	Other
Years Neuro Experience	0 - 5	31.3%	25.0%	14.1%	65.6%	37.5%	12.5%	17.2%	4.7%
	6 - 10	14.5%	18.2%	18.2%	70.9%	38.2%	25.5%	18.2%	10.9%
	11 - 15	18.8%	22.9%	25.0%	64.6%	43.8%	37.5%	31.3%	14.6%
	>15	13.8%	12.3%	18.5%	67.7%	35.4%	32.3%	30.8%	13.8%
Practice Location	Rural	27.3%	27.3%	12.1%	63.6%	30.3%	18.2%	18.2%	15.2%
	Urban	18.1%	18.1%	19.6%	67.8%	39.2%	27.6%	24.6%	10.1%
Caseload % Spasticity	25%	15.4%	14.1%	10.3%	73.1%	33.3%	19.2%	19.2%	6.4%
	26-50%	27.5%	24.6%	18.8%	63.8%	40.6%	24.6%	26.1%	10.1%
	51-75%	17.5%	22.5%	20.0%	65.0%	45.0%	35.0%	27.5%	12.5%
	76-100%	17.8%	17.8%	31.1%	66.7%	35.6%	33.3%	26.7%	15.6%
Academic Preparation	No	.00	.00	13.3%	80.0%	33.3%	40.0%	26.7%	.00
	Yes	21.3%	20.4%	19.0%	67.1%	38.9%	25.5%	24.1%	11.1%
Continuing Education Attendance	No	18.3%	16.9%	8.5%	64.8%	26.8%	11.3%	16.9%	1.4%
	Yes	20.5%	20.5%	23.0%	68.9%	43.5%	32.9%	27.3%	14.9%
Team Member Collaboration	No	8.3%	8.3%	8.3%	62.5%	20.8%	16.7%	8.3%	.00
	Yes	21.3%	20.8%	19.8%	68.6%	40.6%	27.5%	26.1%	12.1%

% = the % within each of the influencing factor groups that selected the intervention for spasticity

Results in **bold** font indicated a significant difference between groups (Chi-square $p \leq 0.05$)

Table 4-35 Therapeutic Interventions for Spasticity – Influencing Factors – PT –(Part III)

Figure 4-22 presents the interaction between the selected therapeutic interventions to manage spasticity and influencing factor groups of PT respondents. The figure graphs the percentage that each of the interventions was selected by the respondents from within each selected factor group.

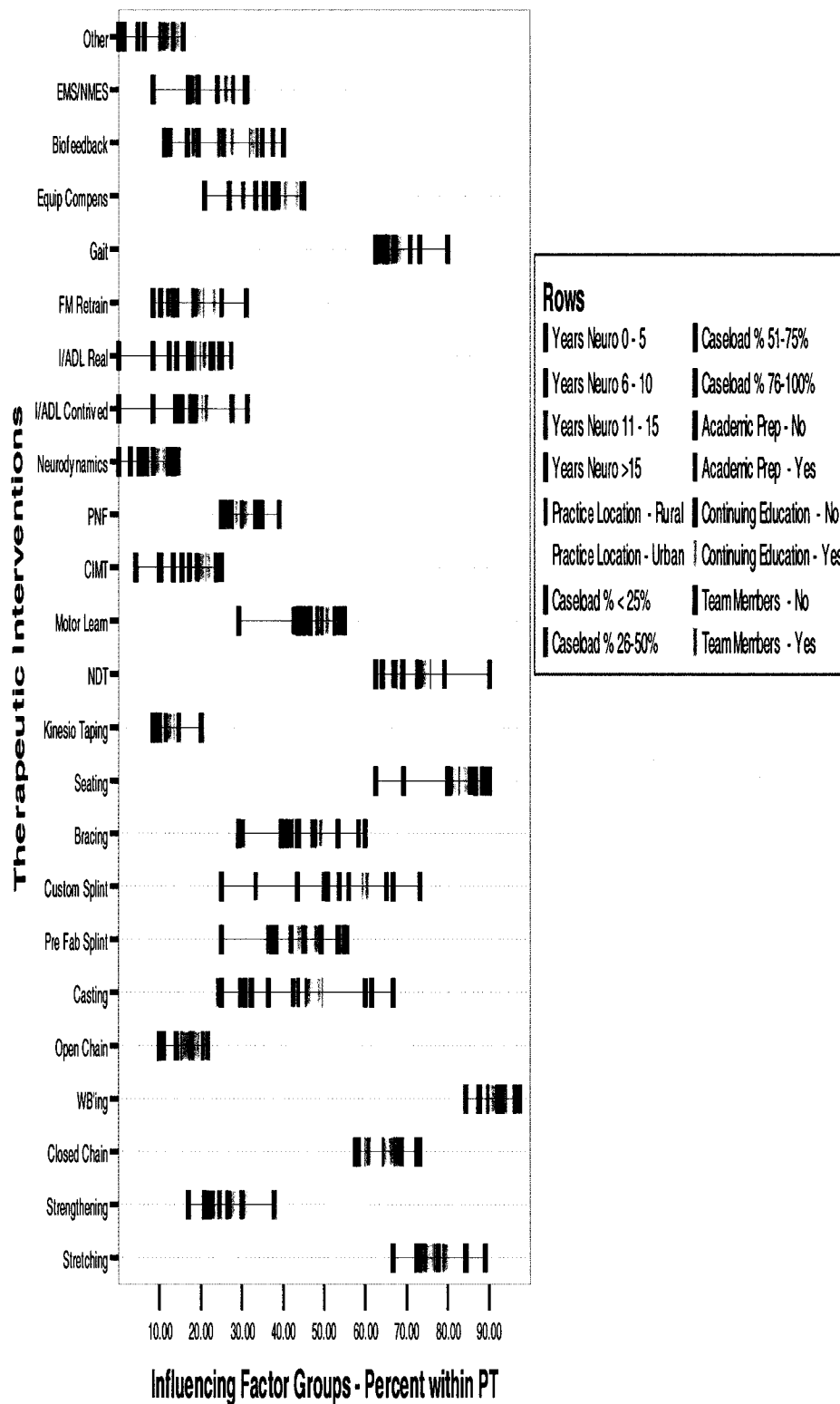


Figure 4-22 Therapeutic Interventions for Spasticity – Influencing Factors – PT

Figure 4-22 appears to demonstrate that there is less variability of responses in the selection of therapeutic interventions, regardless of the influencing factor, among the PT respondents in comparison to the OTs (Figure 4-21). However, to check if observed differences in the response rate for a particular therapeutic intervention were statistically significant, the same Chi-square analytical procedures conducted for the OT respondents just above, were also conducted for the PT respondents. Results of the significant findings are presented below.

	Years Neuro Experience 0 - 5 Yrs	Years Neuro Experience 6 - 10 Yrs	Years Neuro Experience 11 - 15 Yrs	Years Neuro Experience > 15 Yrs	(.05) $\chi^2 = 7.82$ df = 3
Casting	O = 19.0 E = 27.9	O = 20.0 E = 23.9	O = 22.0 E = 20.9	O = 40.0 E = 28.3	8.366
Biofeedback	O = 8.0 E = 16.8	O = 14.0 E = 14.5	O = 18.0 E = 12.6	O = 21.0 E = 17.1	7.833

Table 4-36 Therapeutic Interventions for Spasticity – PT – Years of Neuro Experience Chi Square

Table 4-36 presents the significant findings among the PT respondents in relation to their years of neuro experience and their selection of therapeutic management techniques for spasticity. A significant effect was found among the therapists' years of neuro experience and their selection rate of spasticity therapeutic interventions with respect to the use of casting and biofeedback. While the significance notes that the groups did not respond at the same rate, the therapists with 10 or fewer years of neuro experience tended to use casting at a rate less than expected and therapists with greater than 11 years of neuro experience selected casting at a higher than expected rate. For the selection rate of biofeedback, the least experienced group of PT's selected this option at a rate less than expected and the therapists with greater than 11 years of neuro experience had a higher than expected rate of selection.

The Chi Square analysis found no significant influence on therapeutic intervention choices from any of the following factors: the PT respondent's location of practice (whether urban or rural), caseload percentage of clients experiencing spasticity and academic preparation.

In contrast to the previously observed effect of continuing education and selection of therapeutic techniques in the OT population, the PT's selection rate of the specified therapeutic interventions were significantly affected by attending continuing education. Table 4-37 presents the therapeutic interventions that are linked with the influence of continuing education.

	Continuing Education (No)	Continuing Education (Yes)	$(.05) \chi^2 = 3.84$ df = 1
Strengthening	O = 12.0 E = 19.3	O = 51.0 E = 43.7	3.961
Constraint Induced Therapy	O = 7.0 E = 13.2	O = 36.0 E = 29.8	4.154
Neurodynamics	O = 2.0 E = 6.1	O = 18.0 E = 13.9	3.998
Fine Motor Retraining	O = 6.0 E = 13.2	O = 37.0 E = 29.8	5.613
Biofeedback	O = 8.0 E = 18.7	O = 53.0 E = 42.3	8.785
Other	O = 1.0 E = 7.7	O = 24.0 E = 17.3	8.331

Table 4-37 Therapeutic Interventions for Spasticity – PT – Continuing Education Chi Square

In all cases, the therapists who reported attending continuing education on spasticity management tended to use strengthening, constraint induced therapy, neurodynamics, fine motor retraining, biofeedback and other options at a proportional rate higher than those who did not report attending spasticity continuing education. The written responses the therapists recorded under the 'other' category tended to fall into traditional

approaches (e.g., Brunnstrum, Bobath), manual therapy (e.g., deep pressure massage, acupuncture, myofascial release) and hydrotherapy.

Table 4-38 shows that the Chi Square analysis found a significant effect between the PT consultation pattern with other healthcare professionals and the selection patterns for selecting custom splinting as therapeutic intervention strategies for spasticity. Those who reported consulting with other health care professionals selected custom splinting at a higher proportional rate than those who did not consult.

	Team Consultation (No)	Team Consultation (Yes)	$_{(.05)} \chi^2 = 3.84$ df = 1
Custom Splint	O = 6.0 E = 13.6	O = 125.0 E = 117.4	4.749

Table 4-38 Therapeutic Interventions for Spasticity – PT – Health Care Professional Consultation Chi Square

4.2.2 Influences on Clinical Reasoning for Spasticity Therapeutic Interventions – Client Factors (Q31)

The influence(s) on clinical reasoning for selecting therapeutic interventions from the perspective client factors was investigated in Q31. Therapists were asked to review a listing of 10 possible client factors (plus an ‘other, please specify’ written response option) and assign a ranking for each factor that best reflected the degree of influence (greatest, moderate, minimal or no influence) the factors had on their clinical reasoning process when selecting therapeutic interventions for their clients experiencing spasticity. The ten client factors included: age of client, client’s age at spasticity onset, severity of spasticity, location of spasticity (focal vs. generalized), client’s pain status, client’s

concern for cosmesis, client's funding, co-morbidities, client's pre-morbid musculoskeletal status, client's sleeping patterns and other. The written responses in the "other" category clearly aligned with three themes – the clients' functional abilities, the clients' cognitive/mental status, and the clients' goals. The clinical reasoning factors and the frequency at which they were selected by respondents as having the "greatest influence" is presented in Figure 4-23 below.

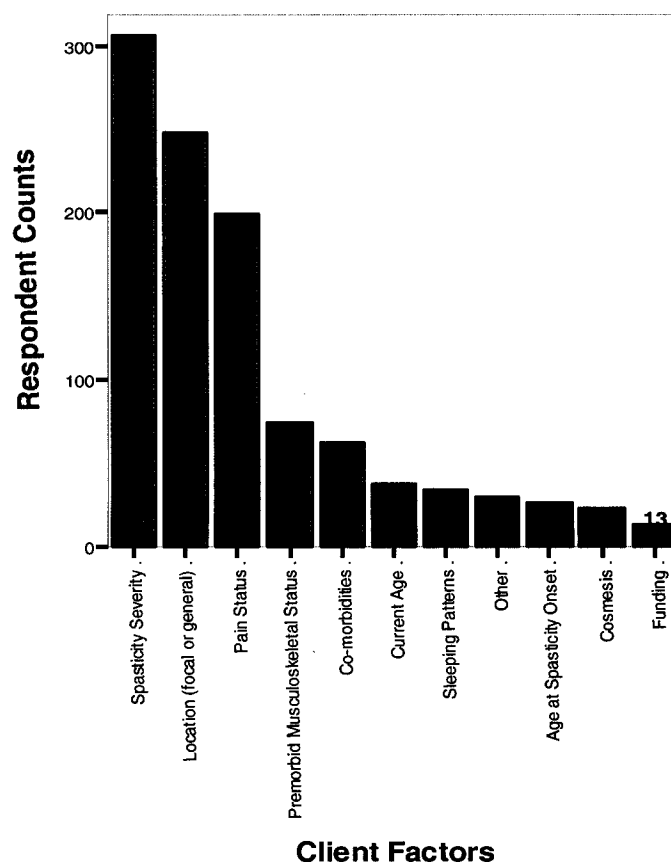


Figure 4-23 Influence on Clinical Reasoning – Client Factors – Greatest Influence

The top three influences that the therapists identified as the greatest influences on their clinical reasoning were the client's spasticity severity, the location of the spasticity (focal or general) and the client's pain status. Table 4-39 divides the total responses from

Figure 4-23 into OT and PT respondents. To see if there were any differences between the OTs and PTs with respect to their rate of selection of the factor as the 'greatest influence' on clinical reasoning a Chi Square analysis was performed on all the influencing factors.

		OT/PT		Total
		OT	PT	
Influence on Clinical Reasoning (Q31)	Spasticity Severity	124	183	307
	Location (focal or general)	101	147	248
	Pain Status	90	109	199
	Pre-morbid Musculoskeletal Status	34	40	74
	Co-morbidities	24	38	62
	Current Age	15	23	38
	Sleeping Patterns	15	19	34
	Other	7	23	30
	Age at Spasticity Onset	14	12	26
	Cosmesis	17	6	23
	Funding	3	10	13
Total		137	213	350

Table 4-39 Influence on Clinical Reasoning – Client Factors – Greatest Influences – OT/PT Responses

As a result of the Chi Square analysis, the only significant difference between OT and PT, with respect to how often they ranked the listed factors as the 'greatest influence', was found with the client's concern for cosmesis. OTs selected this particular client factor at a higher rate than PTs (see Table 4-40 below). Since OT tends to assess psychosocial factors surrounding a client's perception of themselves, it is not surprising that cosmesis was selected by the OTs at a proportionally higher rate.

	OT	PT	$_{(.05)}\chi^2 = 3.84$ df = 1
Cosmesis	O= 17.0 E = 9.0	O = 6.0 E = 14.0	11.673

Table 4-40 Influence on Clinical Reasoning – Client Factors – Greatest Influence – Chi Square

To extend the analysis between OT and PT beyond the ‘greatest influence’ pattern to include how they rated the client factors at other degrees of influence (moderate, minimum or no influence), the ranking patterns for each influence were examined. To check if the observed differences between OTs and PTs in the ranking choices of client’s influencing factors were significant, a Mann-Whitney U Test was performed for each factor. Table 4-41 below summarize the findings of these Mann-Whitney U tests.

	Mann-Whitney U Test	Lowest Mean Rank (greater influence)	Significance. (2-tailed)
Client age	16317.0	PT	.381
Client age at onset	15374.0	OT	.151
Spasticity severity	16742.5	OT	.273
Location (focal/general)	16666.0	OT	.343
Client’s pain status	14730.5	OT	.003
Client’s cosmesis concern	13541.0	OT	.001
Client’s funding	14914.5	OT	.072
Client’s co-morbidities	16452.0	PT	.995
Client’s pre-morbid musculoskeletal status	15815.5	OT	.209
Client’s sleeping patterns	16495.0	OT	.522
Other	106.5	OT	.495

Table 4-41 Influence on Clinical Reasoning – Mann-Whitney U Analysis of ranking choice – OT/PT

The only client factors which demonstrated a difference between OT and PT in ranking order are the client’s concern for cosmesis and the client’s pain status. In both factors, the OTs ranked these as more influential. This ranking significance may be reflective of the psychosocial perspective that is more prominent in OT practice and education.

4.2.2.1 Analysis of Influencing Factors on the ranking patterns of Client Factors for OT

To investigate what may be the contributing influences to the ranking patterns of client factors affecting clinical reasoning, the patterns were compared for various aspects of the OT respondents' practice profile (as previously defined at the beginning of section 4.2). The Mann-Whitney U test was used to compare ranking profiles when the comparison was between two groupings and the Kruskal-Wallis test was used with comparisons of more than 2 groupings (Portney and Watkins, 2000). For the purposes of presenting the results, only statistically significant differences (i.e., those of significance <0.05) will be shown in the tables below. Note that SPSS uses a Chi Square statistic to measure "how much individual group ranks differ from the average rank of all groups"; its value is obtained "by squaring each groups' distance from the average of all ranks, weighting by its sample size, summing across groups, and multiplying by a constant" (SPSS Tutorial). In the tables the significance refers to the probability that the Chi square value is obtained by chance if there were no difference between the groups (therefore tables are only shown when the significance is less than .05).

Ranks	Years Neuro	N	Mean Rank
Client's Funding	Total	147	
	0 - 5 years	29	80.74
	6 - 10 years	47	82.18
	11 - 15 years	34	68.91
	greater than 15 years	35	58.23
	Total	145	
Test Statistics – Kruskal Wallis Test			
Grouping Variable: Years Neuro			
	Client's Funding		
Chi-Square	9.044		
df	3		
Significance	.029		

Table 4-42 Influence on Clinical Reasoning – Kruskal-Wallis Test Analysis of ranking choice – Years Neuro – OT

As can be seen in Table 4-42 as the years of neuro experience increases, funding becomes a higher ranked factor for influencing clinical reasoning among OTs. Additionally, as OTs attend continuing education, they tend to rank client's co-morbidities and sleeping patterns as more influential in their ranking choices for selecting interventions for spasticity management (see Table 4-43).

	Mann-Whitney U Test	Lowest Mean Rank (greater influence)	Significance. (2-tailed)
Client's Co-morbidities	856.000	Y to Continuing Ed	.026
Client's sleeping patterns	809.000	Y to Continuing Ed	.013

Table 4-43 Influence on Clinical Reasoning – Mann-Whitney-U-Test of ranking choice – Continuing Education (Y/N) – OT

The Mann-Whitney did not find any significant differences among the OTs' ranking choices for the following: between their locations of practice (rural/urban), whether or not they received any academic preparation on spasticity (Y/N), and whether or not they consulted with other healthcare professionals (Y/N). The Kruskal-Wallis test did not find

any significant differences among the ranking choices of OTs' with varying caseloads of clients experiencing spasticity.

4.2.2.2 Analysis of Influencing Factors on the ranking patterns of Client Factors for PT

As described above for OT, the ranking patterns of client factors affecting clinical reasoning, the patterns were compared for various aspects of the PT respondents' practice profile. The years of neuro experience was the first influencing factor explored and the results are found in Table 4-44.

Ranks	Years Neuro	N	Mean Rank
Client's sleeping pattern	0 - 5 years	65	122.38
	6 - 10 years	55	137.65
	11 - 15 years	45	98.12
	greater than 15 years	66	103.86
	Total	231	
Kruskal Wallis Test			
Grouping Variable: Years Neuro			
	Client's sleeping pattern		
Chi-Square	13.149		
df	3		
Significance.	.004		

Table 4-44 Influence on Clinical Reasoning – Kruskal-Wallis Test Analysis of ranking choice – Years Neuro – PT

While there is significant difference among years of experience and the rank of influence for sleeping patterns among the PTs, there does not appear to be a clear linear relationship – although the consideration of sleeping patterns does seem relatively more important for PTs with greater than 11 years of experience.

Table 4-45 shows two significant findings that PTs practicing in an urban setting tended to rank the client's pain status and sleeping pattern as more influential than those PTs practicing in a rural setting.

	Mann-Whitney U Test	Lowest Mean Rank (greater influence)	Significance. (2-tailed)
Client's Pain	2666.0	No to Rural Practice	.027
Client's sleeping patterns	2708.0	No to Rural Practice	.029

Table 4-45 Influence on Clinical Reasoning – Mann-Whitney-U-Test of ranking choice –Rural/Urban (Y/N) – PT

The client's sleeping pattern was also the only factor which demonstrated any significance for ranking influence among the PTs and their different caseload descriptor (percentage of clients experiencing spasticity). In Table 4-46 it is clear that the more the clients experiencing spasticity in their caseload, the higher PT respondents ranked sleeping patterns as an influencing factor.

Ranks	Caseload %	N	Mean Rank
Client's sleeping patterns	less than 25%	79	123.47
	26-50%	67	127.16
	51-75%	41	104.85
	76-100%	44	95.98
	Total	231	
Kruskal Wallis Test			
Grouping Variable: Caseload %			
	Client's sleeping patterns		
Chi-Square	8.904		
df	3		
Significance	.031		

Table 4-46 Influence on Clinical Reasoning – Kruskal-Wallis Test Analysis of ranking choice – Caseload % Experiencing Spasticity – PT

The attendance at continuing education also affected how the PTs ranked the client's sleeping pattern as an influencing factor on therapeutic interventions for spasticity. PTs who attended continuing education (Y) ranked the clients' sleeping pattern as a greater influencing factor (Table 4-47).

	Mann-Whitney U Test	Lowest Mean Rank (greater influence)	Significance. (2-tailed)
Client's sleeping patterns	4775.5	Yes to Continuing Ed	.023

Table 4-47 Influence on Clinical Reasoning – Mann-Whitney-U-Test of ranking choice – Continuing Education (Y/N) – PT

Lastly, the client's location of spasticity (focal or general) and pre-morbid musculoskeletal status were ranked as more influential for those PTs who had experience consulting with other healthcare professionals for spasticity management (see Table 4-48).

	Mann-Whitney U Test	Lowest Mean Rank (greater influence)	Significance. (2-tailed)
Location of Spasticity (focal or general)	2130.000	Yes to Team Member Consultation	.034
Client's pre-morbid Musculoskeletal status	1908.000	Yes to Team Member Consultation	.036

Table 4-48 Influence on Clinical Reasoning – Mann-Whitney-U-Test of ranking choice – Healthcare Professional Consultation (Y/N) – PT

There were no significant findings with the Mann-Whitney-U-Test among the PTs' ranking choices and whether or not they received any academic preparation on spasticity.

4.2.3 Influences on Clinical Reasoning for Spasticity Therapeutic Interventions – Therapist Factors (Q32)

Other therapist-related factors affecting the choice of therapeutic interventions for spasticity management were explored in Q32. Therapists were asked to respond to the question “I choose therapeutic interventions based on ...” by selecting one or more of the 10 possible factors:

- my clinical expertise.”
- whether the necessary equipment/expertise is available at my facility.”
- approval by my client's funding source.”
- how comfortable and familiar I am with them.”
- how appropriate they are for my clients. “
- how long they will take to administer/complete.”
- whether research supports their effectiveness.”
- how easy they are to use with my clients.”
- I do not choose my therapeutic interventions – they are chosen by my facility/company.”
- Other: _____

Figure 4-22 presents a frequency graph of all the respondents (OT and PT) and their selection profile for the ‘factors that affect their choice of therapeutic intervention for spasticity management’.

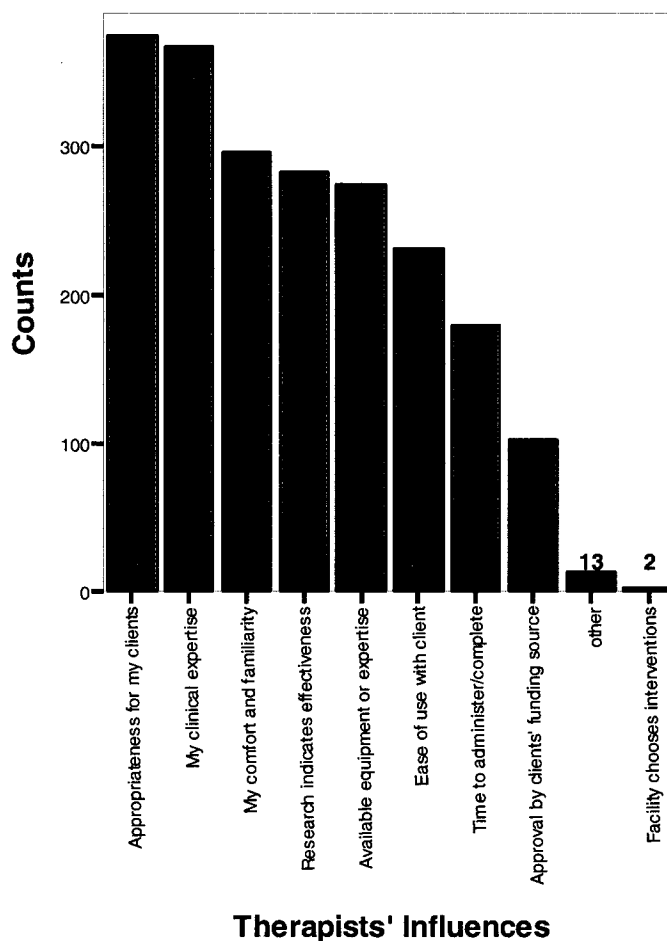


Figure 4-24 Influence on Clinical Reasoning – Therapists' Choice of Factors on Therapeutic Interventions

As can be seen in Figure 4-24, the two most frequently selected responses in the list of factors affecting the therapists' choice of therapeutic interventions for spasticity were 'how appropriate they are for my clients' and 'my clinical expertise'. To see if this pattern of choice is consistent among OT and PT respondents, Table 4-49 presents the percentage with the OT and PT respondents and their selection of factors that affects their therapeutic interventions. For ease of comparison, Figure 4-25 illustrates the responses.

			OT/PT		Total
			OT	PT	
“ I choose therapeutic interventions based onhow appropriate they are for my clients.”	Count	143	231	374
		Column %	96.0	96.3	96.1
	...my clinical expertise.”	Count	144	223	367
		Column %	96.6	92.9	94.3
	... how comfortable and familiar I am with them.”	Count	116	180	296
		Column %	77.9	75.0	76.1
	... whether research support their effectiveness.”	Count	102	180	282
		Column %	68.5	75.0	72.5
	...whether the necessary equipment or expertise is available at my facility.”	Count	112	162	274
		Column %	75.2	67.5	70.4
	... how easy they are to use with my client.”	Count	85	146	231
		Column %	57.0	60.8	59.4
	... how long they will take to administer/complete.”	Count	73	107	180
		Column %	49.0	44.6	46.3
	... approval by clients' funding source.”	Count	41	62	103
		Column %	27.5	25.8	26.5
	other	Count	1	11	12
		Column %	.7	4.6	3.1
	... I do not choose my therapeutic interventions – they are chose my by facility/company.”	Count	1	1	2
		Column %	.7	.4	.5
Total		Count	149	240	389
		Column %	100.0	100.0	100.0

Table 4-49 Influence on Clinical Reasoning – Therapists' Choice of Factors on Therapeutic Interventions – OT/PT

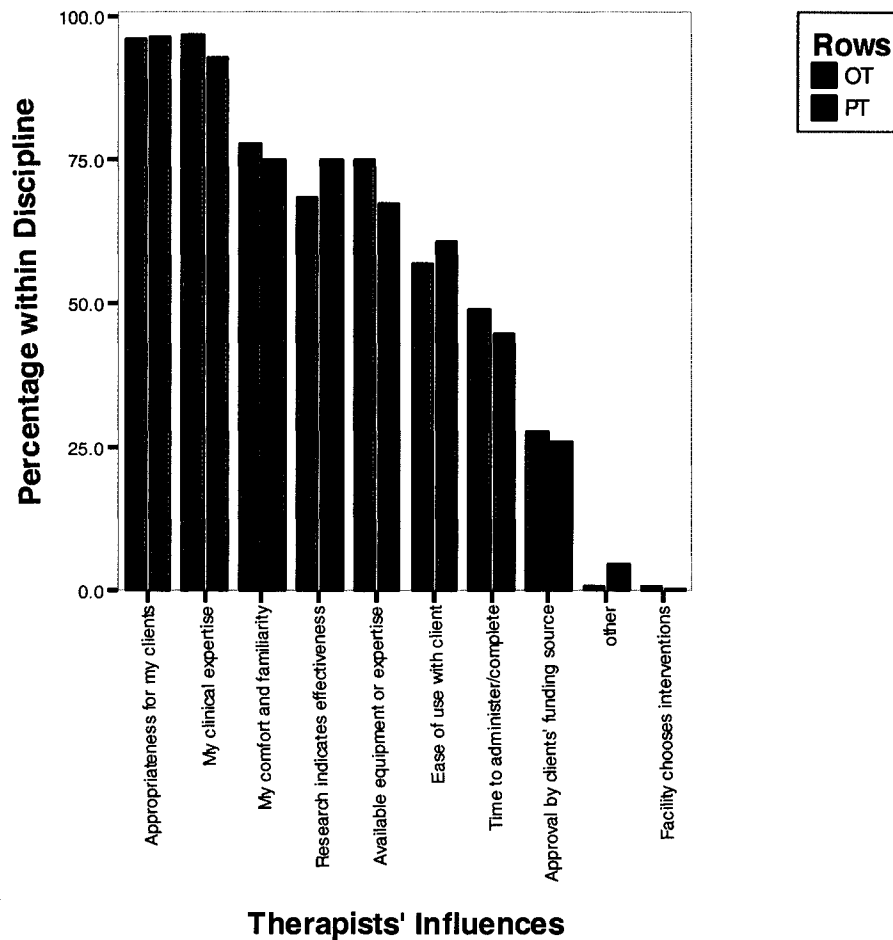


Figure 4-25 Influence on Clinical Reasoning – Therapists' Choice of Factors on Therapeutic Interventions – OT/PT

As can be seen in Figure 4-25, the profile for selecting the ‘other factors that affects their choice of therapeutic interventions for spasticity management’ is essentially the same between OT and PT. Indeed according to the Chi Square analysis, the only statistically significant difference between the OT and PT respondents occurred in the ‘other’ category ($\chi^2 = 4.561$, $df=1$, $sig=.035$), but given the extremely low rate of response it is of little consequence on the overall pattern of choices. The few written responses recorded in the ‘other’ category tended to describe the outcome for the client (i.e., “... whether they are effective for the client – do what works”).

Further, the profile illustrated in Figure 4-24 can also be examined to see if this profile is dependent on any of the other therapist practice-profile influencing factors. Since the OT and PT groups have statistically identical profiles for selecting the 'other factors that affect their choice of therapeutic interventions for spasticity management, a Chi Square analysis was performed for the combined group of OT and PT respondents, checking for changes in the profile within each of the influencing factor groups. It was found that none of the influencing factor groups (years of neuro rehabilitative experience, percentage of caseload with spasticity, academic preparation, continuing education experience, experience with healthcare consultants, and practice location) had any statistically significant effect on the response profile of Figure 4-24. Thus, regardless of any of these external influences, it appears the factors which therapists identify as affecting their therapeutic interventions for spasticity management are somewhat universal, and are dominated by whether the therapist thinks the intervention is appropriate for their client, and by the therapist's own clinical expertise.

Chapter 5 Discussion

In this chapter, the main findings reported in Chapter 4 will be briefly reviewed and the various influences potentially informing the therapists' clinical decision-making process in the area of spasticity management will be explored. In light of these survey results, questions for future consideration will be raised. As well, study limitations will also be addressed.

The overall response rate to the survey was 55% and was consistent with the response rates published for mail out surveys to physicians (54%) (Asch, Jedrzewski, & Christakis, 1997). Strategies that may have contributed to attaining a good response rate included: short personalized introductory letter, follow-up reminder letters and the use of a specified adult neurorehabilitation mailing list obtained from the national therapy associations (Asch et al., 1997). The use of the specified mailing lists increased the chance of the respondent having related experience and/or interest with clients and spasticity. Given that spasticity is one of the factors that therapists in neurorehabilitation will most likely encounter with clients experiencing an UMN lesion (Burridge et al., 2005), it was hoped that the surveyed therapy population would provide input to create a picture of current practice.

Although OT and PT's were not stratified into country of origin for this analysis (as noted in section 4.1.1), it is of interest to comment on the contribution of each association to the overall response rate. Canadian therapists responded at a higher rate compared to their American counterparts (CAOT 60.7%, CPA 64.8%, AOTA 51.4%, APTA 42.3%)

with the Canadian Physiotherapy Association (CPA) having the highest percentage of the overall survey responses (42.5%). The CPA's response rate could be reflective of the CPA's members' interest in the clinical topic, willingness of the neuroscience division to support and participate in research (CPA, 2005a), and/or that the CPA's neuroscience division mailing list has a higher accuracy in terms of addresses and of therapists who work in the targeted area of interest (Asch et al., 1997).

5.1 Survey Respondents

<p style="text-align: center;">Experience</p> <ul style="list-style-type: none"> • 43.7% of respondents had >15 years of total clinical experience • Even distribution of therapists among the years of <i>neuro</i> experience groupings
<p style="text-align: center;">Practice Location</p> <ul style="list-style-type: none"> • OT and PT primarily practice in urban acute and rehabilitation settings • More OTs in Acute ($\chi^2 = 6.144$, $df=1$, $sig.=.013$) • More PTs in home care ($\chi^2 = 10.455$, $df=1$, $sig.=.001$) and private practice ($\chi^2 = 9.953$, $df=1$, $sig.=.002$).
<p style="text-align: center;">Caseload Description</p> <ul style="list-style-type: none"> • Adult clients • Diagnostic categories (87.1%Stroke, 64.6%TBI, 43.6% MS, 40.3% SCI, 20.5 CP, 25.7% Other) • 67% report <50% of their caseload experience spasticity

Table 5-1 Respondents' General Demographic Profile

Table 5-1 provides the general description of the respondents in terms of the demographic questions asking their location of practice, years of experience (since graduation, as well as within neurorehabilitation), description of caseload (percentage experiencing spasticity, diagnoses, age) and work environment in order to gather a description for the respondents' practice profile. The respondents' predominant location

of practice is in acute and rehab settings in an urban environment. It is not a surprising result since the traditional employment opportunities for therapists in neurological rehabilitation is within hospital or rehabilitation centers, which are most often found in urban centers. OTs and PTs report the same profile for proportion in rehab and long term settings, but more OTs work in acute settings and more PTs work in home care and private settings. The general description of the client caseload is that it is primarily an adult age range (the targeted population for this survey) and the most frequent neurological diagnosis is that of stroke or traumatic brain injury. It is also not surprising that stroke and head injury are the predominant reported caseload diagnoses because of the high incidence of stroke and traumatic brain injury in the general population (CSN, 2004). When asked about how many clients on their caseload experience spasticity, approximately two-thirds (67%) of respondents reported that less than 50% of their caseload experience spasticity. This could be reflective of a mixed caseload (e.g., they see a range of clients with different diagnoses and may not encounter spasticity), or the timeframe when the client is receiving services does not coincide with spasticity management (e.g., in the acute rehabilitation phase and prior to developing spasticity, or later when rheological effects are more dominant than spasticity) (Burridge et al., 2005).

Further to the location of practice, the therapists' years of experience (since graduation, as well as within neurorehabilitation) and work environment provided more description for the respondents' practice profile. Close to half (47.3%) of the OTs and PTs that responded to the survey reported to have more than 15 years of clinical experience – though the respondents were spread fairly uniformly across the years of

neurorehabilitation experience groupings (0 – 5, 6 – 10, 11 – 15 and greater than 15 years). This difference between years of clinical experience and years of neurorehabilitation experience could suggest that therapists with greater overall clinical experience may still be limited in terms of neurorehabilitation intervention experience but have the overall clinical interaction experience to help guide intervention. What cannot be determined directly from the reported level of experience is how this experience affects the clinical decision-making or how it may affect those practicing within their environment. What is known from other literature is that therapists are most influenced by – and are heavily dependent upon – their colleagues for new clinical information (Bohannon, 1990; Curtin & Jaramazovic, 2001; Lysaght et al., 2001; Pain et al., 2004; Rappolt & Tassone, 2002; Sweetland & Craik, 2001).

Academic Preparation for Spasticity Management	
Therapeutic Intervention <ul style="list-style-type: none"> Declining in amount over time >15 years experience ($\chi^2=10.361$, $df=3$, $sig.=.016$) and years neuro experience ($\chi^2=9.054$, $df=3$, $sig.=.029$) report more than one course more frequently than other experience groups 	Medical/Surgical <ul style="list-style-type: none"> No change over time (1 – 3 lectures)
Continuing Education	
<ul style="list-style-type: none"> Neuro experience groups attended at the same rate Significant difference in timing of attendance between 0-5 neuro experience group and >5 years neuro experience grouping ($\chi^2=6.808$, $df=1$, $sig.=.009$) More OT than PT attendance within 0-5 year neuro experience group ($\chi^2=6.273$ $df=1$, $sig.=.012$) 	

Table 5-2 Educational Profile

The survey also inquired about the amount of academic preparation therapists received in the area of occupational or physical therapy methods to manage spasticity (Table 5-2

provides an overview of these findings). It may be inferred from the results that the academic content in this area for both OT and PT has been declining, since therapists with over-15-years experience (both since graduation, and in neurorehabilitation specifically) report having more than 1-3 lectures at a much higher rate than the less experienced therapists (with the difference increasing as the level of experience decreases). The decrease of reported spasticity management content over the years since graduation could be reflecting the changes in curriculum structures responding to an expanding knowledge base, competing content demands, changing contexts of delivery, pressures from clients, and external funding agencies (Broberg et al., 2003; M. Davis, Karunathilake, & Harden, 2005). Overall, there was no change reported over time for the amount of academic preparation respondents received for the medical and surgical management of spasticity even in light of changing medical knowledge (Albany, 1997; Ward, 2002).

While the majority of respondents reported attending a continuing education event on spasticity management, attendance was not significantly linked to the amount of academic preparation reported (i.e., those who reported less academic preparation did not attend more continuing education to make up for content shortcomings). Further, there were proportionately more OTs than PTs with 0-5 years of neuro experience who reported attending continuing education and the least experienced OTs and PTs were more likely to have attended a continuing event within the last 2 years.

Team Consultation Patterns

- Consistent between and among OT and PT to range of healthcare professionals
- PT consults more than OT with Orthotics and Prosthetics
- Rural therapists consult more with the GP than do urban therapists
- >50% spasticity caseload consults more with orthopedic surgery

Table 5-3 Team Consultation Profile

Consultation patterns with other healthcare professionals are a contributing factor to the contextual environment where decision-making occurs for the OT and PT. Table 5-3 gives an overview of the findings with respect to consultation patterns. The overwhelming majority of respondents report working or consulting with other healthcare professionals to recommend or provide further medical management of spasticity beyond OT/PT interventions. Notably, therapists report consultation with a very broad spectrum of healthcare professionals in this area. Only two variations occurred with the more prominent relationships observed as practice setting and/or location changed. Rural therapists tended to consult more with general physicians than other physician specialties – not surprising given that most specialists are not located in the rural setting. Secondly, PTs consulted more than OTs with prosthetics and orthotics – again not surprising since PT focuses on gait retraining.

<p>Physician Relationship “Collaborative” relationship (75%)</p> <ul style="list-style-type: none"> • PT refer within 2-3 weeks • OT refer within 2 months
<p>“Hesitant to refer” (25%)</p> <ul style="list-style-type: none"> • “Therapist Directed” or “None” • Difference found between the <5 years and >6 years neuro experience groups • <5 years - “physician does not share the same concern for spasticity”

Table 5-4 Physician Referral Pattern Profile

The majority (75%) of therapists reported referring to physicians for further medical management, predominantly in the area of oral medications and chemodenervation (see Table 5-4 for an overview of the physician referral pattern profile). The typical treatment time before a referral is made to a physician is reported to be less than 2 months (with most PTs treating 1-2 weeks before referral and OTs referring within 2 months). Many respondents (57.4%) indicate they have a collaborative working relationship with a physician regarding management of a client’s spasticity, while 22.8% reported that the physician directs the management. In describing the therapist-physician relationship, the overwhelming majority (75% of respondents) report no hesitancy when it comes to referring to a physician although there was a segment of therapists (roughly 25%) who do report some hesitancy. Those therapists who report hesitancy to refer to the client’s physician are more likely to describe the relationship as “therapist directed” or “no relationship” with the physician.

What is interesting to note is that the therapists with the least amount of neurorehabilitation experience appear to record the lowest amount of confidence in the

physician, both in terms of the physician's concern for spasticity and the physician's experience managing spasticity. This low level of confidence in the physician could be reflective of the therapist's desire to be more involved with the decision-making process. Similar observations have been noted in the nursing literature whereby the nurse's self-confidence and contribution to decision-making with client care were determinants of a good collaborative relationship with the physician (Dechairo-Marino, Jordan-Marsh, Traiger, & Saulo, 2001). Collaborative practice is known to improve client outcomes (Dechairo-Marino et al., 2001), but for therapists who are trying to establish their own practice, they may not yet be confident in establishing working relationships or arriving at collaborative decisions with other team members (Edwards, Jones, Higgs, Trede, & Jensen, 2004). Conflict between healthcare professionals arising from a discrepancy in evidence based practice values, questionable expertise and/or disagreement regarding client care have been found to negatively impact the decision-making process (Bucknall, 2003; Loisel et al., 2005); from the survey results, it seems that such conflict may be an issue for roughly 25% of therapists (the group reporting a hesitancy to refer to a physician), primarily those new to neuro rehabilitation.

5.2 Therapeutic Management Techniques

INTERVENTION PROFILE	
<ul style="list-style-type: none"> • Profile for spasticity intervention between OT and PT very similar 	<ul style="list-style-type: none"> • Different OT versus PT profiles for rheological changes, negative symptoms, functional retraining

Table 5-5 Intervention Profile

The next step of the analysis addressed the therapeutic management techniques therapists are currently employing with clients who have upper motor syndrome – more specifically, spasticity. Establishing the range of therapeutic interventions for spasticity management is a necessary first step to develop future clinical research opportunities that link specific interventions with client outcomes (Dumas, O'Neil, & Fragala, 2001). The survey results revealed that the top four therapeutic interventions (weightbearing, seating/positioning, stretching, and NDT) are chosen much more frequently than all others, and are chosen at almost the same rate by OTs and PTs. Further, the top 11 techniques (out of a list of 23) are essentially the same between OT and PT, with only some minor shifting of preference ordering (i.e., close chained activities, gait and bracing in the top 11 for PTs, and I/ADL in contrived or real environments and equipment adaptive equipment training for OTs).

The therapeutic management of spasticity is only one aspect of the UMN syndrome, and as such, it may be treated in isolation, but it may also be affected by the management of the other UMN challenges (negative symptoms and rheological changes) and how therapists approach the functional retraining aspect (Bhakta, 2000; Damiano, 2001; O'Dwyer et al., 1996; Teasell et al., 2005). To see if there was a difference in how therapists employed their intervention techniques, the therapists were also asked to select their intervention choices for negative symptoms (e.g., weakness, incoordination), rheological changes (e.g., stiffness, atrophy, fibrosis, and contracture) and functional retraining. While there did seem to be some similar rank ordering within the rheological management, there was a definite difference between OT and PT for the selection of

techniques for negative symptoms and functional retraining. The difference in therapists' ranking of the intervention approach between OT and PT for negative symptoms and functional retraining may represent several possibilities – each clinical challenge requires the appropriate management technique(s) and the respective difference between the two discipline's core knowledge (Bucknall, 2003; Hedberg & Larsson, 2004; Teasell et al., 2005).

The consistent profile of intervention choices between OTs and PTs for spasticity management indicates that there may be influencing factors such as educational content or practice environment conditions that affect the therapists' decision-making in choice of specific interventions (Rappolt & Tassone, 2002). For example, Rappolt and Tassone (2002) found that even when therapists highly valued continuing education, they were still more influenced by informal peer consultations for educational information or for implementation of new knowledge.

5.3 Influencing Factors

OT Respondents	PT Respondents
Factors with No Significant Influence <ul style="list-style-type: none"> • Years of neuro experience • Location of practice • Continuing education 	Factors with No Significant Influence <ul style="list-style-type: none"> • Location of practice • Caseload % • Academic preparation
Factors with Significant Influence <ul style="list-style-type: none"> • Caseload >75% increased selection of kinesio taping • Academic Preparation increased selection of FM • OT without Team – increased selection of open chain and strengthening 	Factors with Significant Influence <ul style="list-style-type: none"> • Years neuro experience increased selection of casting and biofeedback • Continuing Education increased selection of strengthening, CIMT, neurodynamics, FM, biofeedback • PT without Team members increased selection of more custom splinting

Table 5-6 Influencing Factor Profile

The therapists' practice profile was investigated and presented in detail in Section 4.1 and the influence of selected profile factors on therapeutic intervention selection was presented in section 4.2. Table 5-6 contains the summary of findings related to the influence of practice profile factors on intervention choices. The survey offered an opportunity to see similarities and differences among different practice profiles. The rationale behind developing this profile was that it might play a significant role in the selection of spasticity management interventions. Overall, the general observation can be made that very few factors appeared to directly influence the frequency with which OTs and PTs reported using the various interventions. For OT: the higher percentage of spasticity caseload increased the rate of kinesio tape selection; more academic preparation was linked to an increase in fine motor selection; and, having no consultation with other team members led to a higher use of open chain and strengthening activities.

The increase in use of kinesio taping for those with a higher caseload percentage experiencing spasticity might indicate use of the literature for new strapping techniques to manage shoulder subluxation issues (Foongchomcheay, Ada, & Canning, 2005). Increased use of fine motor retraining for those with more academic preparation in spasticity management may indicate more knowledge regarding therapy directed at regaining use for function in a motor learning approach (Carr & Shepherd, 1982) or following focal spasticity blocks (Mayer, 2004). Finally, more use of open chain and strengthening activities by OTs in the absence of team members may indicate that the client requires these interventions which are more typically provided though PT. What is particularly surprising is that OT's reported attending continuing education at a higher rate (within the 0-5 neuro group), but there were no links between intervention preferences and continuing education attendance (this will be addressed more fully below). For PT, however, there were significant relationships found with continuing education. More continuing education was significantly linked to an increased use of strengthening, constraint induced therapy (CIMT), neurodynamics, fine motor retraining, and biofeedback. PTs with greater than 11 years of experience also selected casting and biofeedback at higher rates than their less experienced colleagues, and working with other professionals increased the use of custom splint interventions.

Figures 4-21 and 4-22 lead to further discussion beyond the significant findings reported. At first glance, it may appear that the PT's have a more defined pattern of treatment protocol for spasticity management, because of the observed 'smaller spread' in intervention choice frequencies compared to the OT's. Given that the amount of

academic preparation (though content was not specified) is reported to be similar between OT's and PT's, what contributes to the narrowing of the PT intervention selections? One could suggest a list of possible interpretations related to PTs in particular, such as: practice is more defined to the components of the physical domain; they have a larger presence in the healthcare domain so physicians, clients or clients' families may specifically request certain techniques; funding structures (e.g., insurance) may be tied to specific techniques; and/or PT content experts tend to be more involved in the development of consensus panels for neurorehabilitation best-practice guidelines, which eventually contribute to best practice guidelines or continuing education content (Dumas et al., 2001; Jensen, Gwyer, Shepard, & Hack, 2000; Panel, 2001). Or, perhaps, the larger spread within the OTs is related to the practice domain where more emphasis is placed upon the resumption of occupational performance – where physical components are only one variable in their technique repertoire to address the broader consideration of function (CAOT, 1999). It could also point to the lack of consensus guidelines for OT,

Since the reported academic preparation is relatively minimal for both professions in the area of spasticity management, other influences appear to be playing a larger role in shaping the therapists' intervention choice. The majority of respondents reported going to continuing education in the area of spasticity management in the last 2 years – with proportionately more OT respondents reporting attendance at continuing education than the PT respondents. However the OTs' eclectic patterns are not seen to be influenced at all by continuing education directly. Thus, for the OTs it is not clear if the education had little effect, or if perhaps the information gained was diffused into many different types

of interventions in their repertoire (so no individual intervention changes dramatically). On the other hand, PTs' intervention repertoire appears to be linked not only to continuing education but also to the influence of consulting with other healthcare professionals (contrary to the OT pattern effect). Perhaps the PTs are attending learning events for specific techniques, or they are attending multidisciplinary events and learning how to bridge their specific techniques with those of other healthcare professionals. It could also point to the fact that PT has a clearer domain of practice with more structured training or intervention protocols (Dumas et al., 2001).

Even though there were some relationships found between continuing education and intervention choice, it is not clear what aspect of continuing education was influential. Was the content based on skill development, were continuing education events multidisciplinary in nature and information was exchanged, or was the information from continuing education events brought back and shared with other therapists who then adopt the techniques through indirect experiential learning of the continuing education event from their peers? As mentioned earlier, using peers in this fashion as the preferred source of education or integration of new knowledge from continuing education information has been reported by Rappolt and Tassone (2002). In practice, continuing education content for spasticity management is often found to be targeted to a combined OT and PT interdisciplinary audience (Albany, 1997; ICHE, 2002). However, since the type or content of the continuing education event was not reported by the respondents, it is not clear if interdisciplinary continuing education is the reason for the similarity in the spasticity intervention profile. Additionally, since the majority of therapists reported

consulting with other team members, the homogeneity of response between OT and PT could be reflective not only of continuing education but of a collaborative practice model in which team goals are set for a client (Edwards et al., 2004). Edwards et al. (2004) suggests that the new models of practice (e.g., community based, family centred) have changed the way PTs create their goals to reflect client/team goals rather than their discipline specific knowledge base. Given that OTs also practice in these models of practice, team goal setting may have given rise to the observed similarity between the OT and PT intervention profile.

One clear example of a skill based technique definitely linked to years of experience, and therefore likely being learned 'on the job' or from more experienced colleagues (experiential learning), occurs with casting. As years of neurorehabilitation experience increase, so does the reported use of casting as a management technique. Related to experience is the relative percentage of clients a therapist has on his/her caseload with spasticity. The use of NDT (Bobath) is a therapeutic approach for which therapists often attain certification through continuing education. Of interest is that as the relative percentage of clients with spasticity on a therapist's caseload increases the use of NDT decreases. Perhaps this is an indication that as the opportunity to see many clients with spasticity increases (and most likely different degrees of spasticity challenges) the use of other techniques, aside from NDT, is learned to be more effective or appropriate for the individual client needs. However, the use of NDT was still higher among the rural therapists – although this may simply be a matter of resources; once a therapist is trained, additional equipment or resources are not required and the technique can be utilized with

the client in any environment. The observed change in use of NDT in relation to these factors may be an example of how decision-making may be influenced by the individual client's needs, the therapist's experience, and the context where the intervention decision is made. Or, the change could be reflective of an inadequate definition of the NDT approach itself (D.U. Jette et al., 2005).

The survey provided an array of interventions ranging from specific intervention protocols (e.g., CIMT), neurophysiological approaches (e.g., NDT, PNF), orthopaedic based interventions (e.g., stretching, strengthening), functional approaches (ADL/IADL retraining) to modalities. There is evidence in the literature that physiotherapists tend to base their clinical practice around approaches rather than individual treatments, and in particular the Bobath (NDT) approach is predominant (Pollock, Baer, Pomeroy, & Langhorne, 2003). Pollock and colleagues (2003) have made the recommendation to move away from approaches in favour of specific techniques; however it appears that there is a gap between best practice evidence currently available for therapists in the scientific literature and actual clinical care (Grol & Wensing, 2004; D.U. Jette et al., 2005). While it appears that OT follows this same trend in practice, there is no similar literature that has studied this issue for OT.

Greatest Client Influences reported by OT and PT <ul style="list-style-type: none"> • Spasticity severity • Location of spasticity • Client's pain
Influences Ranking Higher for OT than PT <ul style="list-style-type: none"> • Client's concern for Cosmesis • Client's Pain ranked

Table 5-7 Client's Influencing Factor Summary

The therapists were also asked to identify what other factors influence their clinical reasoning when selecting therapeutic interventions for spasticity management, both from the perspective of considering the client's needs as well as their own perspective. With regards to the influences on the therapists' clinical reasoning and client factors, the overwhelming choice for the top three factors for both OT and PT included severity of spasticity, location of spasticity (focal vs. generalized) and the client's pain status. The only client factors which demonstrated a difference between OT and PT in ranking order were the client's concern for cosmesis and the client's pain status. In both factors, the OTs ranked these as significantly more influential. This ranking difference may be reflective of the psychosocial perspective that is more prominent in OT practice and training.

CLIENT Influences	
OT	PT
<ul style="list-style-type: none"> • Years of neuro experience <ul style="list-style-type: none"> ○ Funding receives a higher ranking with increased experience • Continuing education attendance <ul style="list-style-type: none"> ○ Sleeping patterns and co-morbidities ranked higher 	<ul style="list-style-type: none"> • Years of neuro experience (>11), higher % of caseload spasticity, continuing education attendance <ul style="list-style-type: none"> ○ Contributed to a higher ranking of sleeping pattern • Team environment experience <ul style="list-style-type: none"> ○ Higher ranking for location of spasticity and musculoskeletal status

Table 5-8 Client's Influencing Factors Correlated with Practice Profile

Table 5-8 summarizes how the therapists' practice profile affects respondents' selection of important client influences. Note that within the OT group, the more experienced therapists ranked funding at a significantly higher level of importance. This ranking could be viewed as a pragmatic approach given limited resources or it could be interpreted as a limiting strategy that funding guides intervention instead of what the

client needs – not in keeping with the psychosocial approach! The only link to continuing education within OT was that it positively affected the therapists' ranking of the client's co-morbidities and sleeping patterns. Within PT there were several findings noted in Table 5-8. The importance of the client's sleeping pattern was significantly linked with the therapist's location of practice (more important for urban therapists), attendance at continuing education (more important for those who attended), and caseload with a higher percentage of clients experiencing spasticity (more important for higher caseload percentage). The PTs practicing in an urban location also rated pain as more influential than their counterparts in rural practice settings. Finally, the presence of team members was also seen to be significantly linked to the PT's higher rankings for influences of the client's location of spasticity (focal or general) and the client's pre-morbid musculoskeletal status.

OT and PT: Top-Ranking Profile	
"I choose therapeutic interventions based on . . .	
1.	"How appropriate they are for my client"
2.	"My clinical expertise"
3.	"How comfortable and familiar I am with them"
4.	"Whether research supports their effectiveness"
No significant effect from other factors	
<ul style="list-style-type: none"> • Caseload %, years neuro experience, academic preparation, continuing education, practice location, or team environment 	

Table 5-9 Therapist Ranking of Intervention Influences

Probably the most influential factor affecting the therapists' choice for spasticity management interventions is related the therapists' experience for determining the

appropriate interventions for each individual client (see summary in Table 5-9). One question on the survey specifically asked what influenced the therapists' clinical reasoning from their own perspective. This question found that, ultimately, the primary factors seen as affecting the therapists' decisions were their own 'clinical expertise' and how appropriate they felt the interventions were for their clients. These top two factors were consistent across all aspects of the intervention practice profile. The dilemma with the intervention profile result is that there is limited research evidence to suggest that the more commonly chosen techniques are conclusively effective for spasticity management. Several Cochrane systematic reviews have noted that the results of therapy interventions for clients experiencing UMN lesions are not conclusive and further studies are required (Pollock et al., 2003; Steultjens et al., 2003; Taricco et al., 2000; Trialists, 2003; Waskiak, Hoare, & Wallen, 2004). Additionally, specific interventions such as CIMT (Sirtori, Fatti, & Davide, 2003) and the effect of orthotic devices on limb posture (Kent, Gilbertson, & Geddes, 2002) are currently at a protocol status for review.

Secondary to those top two factors were 'how comfortable and familiar' the therapists are with the techniques, and 'whether research supports its [the intervention] effectiveness'. Viewed together, these top four factors appear to relate to evidence based practice. However, it is not clear from this study how research evidence is used by the therapists for their overall selection of therapeutic management interventions with clients experiencing spasticity. When interpreting the patterns of intervention choices it should be noted that just because interventions have been chosen more frequently does not

necessarily mean that they are proven to be effective, are proven to be ineffective or that the therapist has made a poor decision in selection.

When trying to make sense of what is influencing therapists' decision-making, perhaps it is best to hone in on the results which directly asked the therapists just this question ('I choose therapeutic interventions based on...'), and view them within the light of what has been inferred from the previous discussions correlating practice profile and intervention choices. As in other professions, their experience and what they think will work for their client are the most dominant factors – regardless of OT/PT discipline (Bucknall, 2003). What is striking is the use of research supporting the technique's effectiveness is listed at the same level as their familiarity about using a technique. Since there is not much definitive research on therapeutic interventions for spasticity and/or the results can be inconclusive at times – therapists may be unsure how to interpret or implement research study findings in their particular clinical practice.

In client-centered therapy practice the interpretation of research evidence must be considered along with the individual client's circumstances and preferences and the therapists' experience and expertise (CAOT, 1999; Dubouloz et al., 1999; Tickle-Degnen & Bedell, 2003). Aside from the perspective of the client, therapist and evidence, consideration of models of practice also needs attention. The majority of therapists reported consulting with other team members. The homogeneity of response between OT and PT could be reflective not only of education but of a collaborative practice model in which team goals are set for a client (Edwards et al., 2004). Edwards and colleagues

(2004) suggest there may be new knowledge that is created through the collaborative decision-making process, particularly in light of the needs and wishes of clients for therapy which may not be supported by the empirical or measurable evidence.

The fact that therapists ranked the impact of research support for technique effectiveness to inform practice below other influences (client needs and clinical expertise) points to challenges with current research clarity and access, the ability of the therapists to synthesize current evidence into practice, the ability of researchers to develop protocols that can be applied to a practice context, and poor understanding of how context and therapist experience guide therapists' decision-making (Chiarello et al., 2005; D. U. Jette, Grover, & Keck, 2003). While randomized controlled studies provide the most convincing evidence for therapeutic intervention efficacy (Duncan, 1998), there is a need for qualitative research in contextual practice settings to understand the ways in which "learning from one's own practice is a legitimate source of knowledge" (Jensen et al., 2000, p.31)

5.4 Educational Implications

As was stated in Chapter 2 of this thesis, it is hoped that this study marks a first step in identifying influential factors which may provide educators with more guidance for educating therapists for effective decision-making in spasticity management. What appears to be clear from the survey results is that regardless of formal education (academic or continuing), the therapists' decision-making is highly influenced by their experience. Therefore, the first step for any educational recommendations needs to begin

by further understanding what influences the therapist's experience and thus the decision-making process.

It is clear that an evidence based practice (EBP) is central to the practice mandate for both OT and PT (APTA, 2003; CAOT, 1999; CPA, 2005b). EBP not only draws on the 'science' of therapy, (systematic evidence) but also integrates the 'art' of therapy (therapists' experience) together with the client's needs or desires to make informed decisions for care (Chiarello et al., 2005; CPA, 2005b). The area of neurorehabilitation is very complex and each client has many different areas of concern beyond one aspect of their physical function (e.g., spasticity). Clients often have cognitive, perceptual, sensory, psychosocial, environmental, and other barriers to be addressed in order for the client to pursue what they need and/or desire to do in their daily occupational routine (Teasell et al., 2005). While a physical challenge such as spasticity can interfere greatly with an individual's mobility, pain, ability for basic and instrumental activities of daily living, it is not clear what the most effective spasticity intervention may be, given the complexity of the client. In the case of spasticity management, there is a gap between the current practice profile found in this study and the available scientific evidence to support the interventions selected. What is suggested by the current analysis is that the common thread linking OTs and PTs in their intervention selection is that of their own clinical knowledge or experience.

Even when therapists follow a structured systematic approach to integrating research with client evidence, it still requires professional expertise to make the connection applicable

for the therapy process of practice (Rappolt, 2003). At the individual therapist level, decisions may appear to be motivated by their intuitive approach based upon evidence from their own clients (multiple single case studies), anecdotal reports (observation or reports from other colleagues), continuing education seminars or the collaborative team experience. Education, whether in pre-professional academic settings or in continuing professional development, needs to overtly address the clinical decision making process in order to make explicit how evidence and experience are united in the practice process to meet the client's needs. Additionally, the survey analysis indicated intervention choice is affected by differing environmental and experience factors; thus the experiences learned from the environmental demands need to be reflected upon and explored in the educational process. Further, the relatively low ranking for the use of research in the selection of treatment interventions found in this survey indicates that other factors need to be explicitly considered in the educational process. As previously mentioned, Edwards et al. (2004) suggests there is collaborative decision-making process in the new models of practice beyond discipline specific knowledge – pointing to a need for transparency in preparatory and continuing education addressing the collaborative decision making process.

While it is clear that there is need for further research to guide practice, the methods used need to include quantitative, qualitative and client centered research in order to address the gap between evidence and clinical knowledge (D. Davis et al., 2003). Research must engage practitioners in their contextual environment and resist the temptation to “pronounce how practice should be conducted” (Keilhofner, 2005). To effect practice

changes, researchers need to consider innovations to their studies that address the environmental barriers that practitioners and clients face when trying to implement EBP (D. U. Jette et al., 2003). As well, it cannot be assumed that research will directly shape and transform practice; there needs to be evidence on how to effectively implement evidence in an ever-changing and demanding practice environment (Grol & Wensing, 2004; Keilhofner, 2005).

The results of this study show that the most experienced therapists often differ from the least experienced therapist group in approach to intervention. The more experienced group may be interpreted as filtering their client's information through their own experience which has been influenced by their environmental context, including regulations, peer feedback and client opinions (D. U. Jette et al., 2003). Since more experienced therapists are likely the most influential source of information in the practice setting (Bucknall, 2000; Hedberg & Larsson, 2003; Rappolt & Tassone, 2002), these experienced therapists should be the focus for researchers, educators and policy reformists. Researchers could benefit from studying the elements that contribute to the experienced practitioner's decision-making process for specific interventions. Educators could benefit from exposing students to the mentoring possibilities of an expert in a contextual setting. Students need to learn from experts in a practice setting who are "thinking out loud" as they identify and solve problems (Jensen et al., 2000). Administrators are concerned with client outcomes and EBP. In order to promote translation of research into practice, organizational changes must be supported so

environmental barriers can be overcome and best practice standards can be met (Rappolt & Tassone, 2002).

So how does one start influencing therapists? The starting point should be in the academic preparation and key elements to EBP and the decision-making process should not be taught in separate courses. Client complexity is one of the most influential factors on decision-making (Bucknall, 2003). The decision-making process for selecting interventions begins with client observation and then engages the EBP process. As such, EBP concepts should be woven throughout the contextual learning environment, both in classroom work and fieldwork experiences. The role of professional expertise across the EBP process needs to be reconsidered by educators, since the integration of evidence and decision-making process will still be dependent upon therapists' judgment and professional expertise (Jensen et al., 2000; Rappolt, 2003). Decision-making strategies need to be taught explicitly so that the therapist can effectively learn how to use the information available within a context of competing demands on their time. Education needs to address not only the cognitive skills to make a decision, but the clinical landscape in which the decisions must occur (Bucknall, 2003).

What needs to be known, what is learned, when it is learned and how it is learned need to be clearly defined and stated in all educational arenas so that participants may be better able to integrate theory information into practice (Broberg et al., 2003). While the use of interactive workshops has been shown to improve healthcare outcomes in medicine (Thomson O'Brien et al., 2001), there remains a need for a review of how healthcare

providers use EBP information in the organizational behaviour context (Grimshaw & Eccles, 2004). Whatever the research method selected to better understand practice, or improve client outcomes, “the knowledge that we generate needs to add not only to what we know, but also to what we know how to do” (Keilhofner, 2005, p.238).

5.5 Limitations

This study was designed and conducted with the aims of illuminating current practice trends, and of inferring if/how individual factors influence the clinician's decision making about spasticity management. The respondents in the overall study may not have captured a true cross-sectional picture of the therapists working in the area of neurorehabilitation since inclusion in the study relied on their belonging to their national association and participation was voluntary. While the therapists who responded were self-identified as practicing in the field of adult neurorehabilitation, the mailing list is restricted to those who pay for membership and thus may not capture the entire population of therapists working in the area.

The data analysed for this thesis, noted in section 3.4, were limited to investigating the survey responses from the specific questions listed in Table 3.3. While these particular questions were chosen to outline the profile of current spasticity management intervention choices and possible factors which may influence the choices provided by the respondents, it does not provide the complete picture of how the respondents may apply the intervention choices to particular cases. Future analysis will integrate the findings of this study with the case study application from the larger survey data set.

The respondents' country of origin within the grouping of OT or PT (outlined in Table 4-1) was not analysed in this thesis as an influencing factor in relation to the intervention profile. As a result the potential differences within or between the OT or PT grouping due to differences in country of practice were not analyzed. Additionally, specific university degree qualifications of the respondents (e.g. diploma, bachelor, master level entry, post-professional masters, or doctoral training) or content description of continuing education was not collected on the survey, rendering the comparison among university education levels and intervention profiles impossible. While a field test was conducted with ten occupational and physical therapists (therapists sampled from USA and Canada) to ensure content validity, the language for interventions listed in question 30 may not have been interpreted uniformly between disciplines and/or country of practice. The definition of spasticity with respect to its origin (i.e., spinal or cortical) was not included in the survey resulting in a profile of intervention choices that did not specify whether the intervention selected was addressing cortical or spinal spasticity. While many clinicians specializing in the area of UMN rehabilitation may define spasticity according to Lance's (1980) consensus definition, this definition was not provided to the participants. As a result some respondents may have defined spasticity as a full range of clinical manifestations all due to an increased stretch reflex (Taricco et al., 2000). As a result, respondents to the survey may not have interpreted the questions with the same reference definition. Debate to further define spasticity continues in the literature (Burridge et al., 2005) There was no client outcome data collected and so effectiveness of the intervention profile in relation to an individual client outcome or therapist's competence cannot be determined.

The survey was quite extensive and time consuming. Therapists may not have undertaken the task of completing the survey if their interest did not outweigh their other practice obligations. Depending upon the practice setting, documentation time is not reimbursable and so additional paperwork in the name of research may not be welcomed by a therapist – regardless of interest or experience. This may have introduced a response-bias, with the busiest therapists least likely to respond.

Finally, while all efforts were made to ensure a good response rate, there were external influences beyond the control of the investigator that may have prevented even more therapists from responding. During the mailings and survey collection period, there were two natural disasters that occurred in the Northeast. The first was Hurricane Juan, and the second was the Northeast Power Grid outage. Even if the survey did reach the intended destination, completing the survey may not have been a priority as other life sustaining activities were most likely prioritized.

5.6 Future Steps

Prior to this survey, there was not a clear picture of who the neurorehabilitation therapists are, and what range of therapeutic intervention repertoire for spasticity management is employed. Beyond this work's initial descriptive outline of *who* therapists are, and *what* therapeutic techniques or approaches are used, finding out *how* the therapists received their training and *why* therapists employ the techniques they do needs further investigation. While the respondents clearly identified that their therapeutic intervention

choices were based upon the ‘appropriateness for the client’ and the therapist’s ‘expertise’, it is not clear what constitutes the variables of ‘appropriateness’ and ‘expertise’. Additionally, since there was no way to measure client outcomes or therapist effectiveness from the respondents’ survey, it is unclear if the intervention selections – regardless of the rationale for use – are the most efficacious methods to maximize a client’s outcome. Outcome studies to support or provide best practice guidelines for the most used therapeutic intervention are warranted.

Following the successful investigation of the specific survey questions delineated in Table 3.3 for the descriptive analyses and searches for influencing factors outlined in this thesis, the next step will be to extend this type of analysis to the other remaining question responses in the survey. The SPSS database developed for the analysis presented in this thesis incorporates responses to all survey questions, and thus the statistical methods developed here have set the stage to continue searching for treatment-decision influences as well as looking at other aspects of the survey responses.

Additional future avenues of study could focus on finding out more about how therapists apply intervention techniques, how they can make their decision-making process explicit (e.g., why they select the intervention and when they apply the intervention), and how they measure their treatment effectiveness. The team environment results point to the potential for exploring inter-professional learning modules in the area of neurorehabilitation (and spasticity management); if a client’s spasticity management

requires many healthcare professionals, would it not be reasonable to train them together as a team for evidence based decision-making?

DALHOUSIE University

Survey

Current Trends in the Therapeutic Management
and Outcome Measurement of Clients with Spasticity:
An Occupational and Physical Therapy Perspective

Diane MacKenzie, OTReg(NS)

e-mail: diane.mackenzie@dal.ca
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Please send completed surveys in the addressed envelope to:

Diane MacKenzie
School of Occupational Therapy
Faculty of Health Professions, Dalhousie University
5869 University Avenue, Forrest Building, Room 215
Halifax, Nova Scotia, Canada B3H 3J5

Please do **NOT** write your name or any identifying
information on this survey.

Please indicate your answers by checking the box that
corresponds with your response. Note: In this survey, the term
client is synonymous with patient.

1. What percentage of your client caseload experiences spasticity?
 - 1 ☐ Less than 25%
 - 2 ☐ 26 – 50%
 - 3 ☐ 51 – 75%
 - 4 ☐ 76 – 100%
 - 5 ☐ None - *Thank you for your time.* You do not need to
complete the rest of the survey. Please return your survey
in the enclosed envelope.
-
2. Which of the following professions are you licensed to practice?
 - 1 ☐ Occupational Therapy (OT)
 - 2 ☐ Physical Therapy (PT)
3. How many years have you been practicing since graduation?
 - 1 ☐ 0 – 5 years
 - 2 ☐ 6 – 10 years
 - 3 ☐ 11 – 15 years
 - 4 ☐ greater than 15 years
4. How many years have you been practicing in the area of neuro
rehabilitation?
 - 1 ☐ 0 – 5 years
 - 2 ☐ 6 – 10 years
 - 3 ☐ 11 – 15 years
 - 4 ☐ greater than 15 years
5. Which best describes your practice setting? Check all that apply.
 - 1 ☐ Acute Care
 - 2 ☐ Rehabilitation
 - 3 ☐ Home Care
 - 4 ☐ Long-Term Care
 - 5 ☐ Private Practice

6. Which best describes your practice location?

1 ☐ Rural Setting

2 ☐ Urban setting

7. What age group best reflects your client caseload? Check all that apply.

1 ☐ Infancy and Childhood (0 – 11 years of age)

2 ☐ Adolescents (12 – 18 years of age)

3 ☐ Young Adults (19 – 25 years of age)

4 ☐ Adults (26 – 40 years of age)

5 ☐ Middle Adulthood (41 – 65 years of age)

6 ☐ Older Adulthood (66 years of age and older)

8. What neurological diagnostic category best reflects your client caseload? Check all that applies.

1 ☐ Acquired brain injury (Traumatic brain injury)

2 ☐ Stroke

3 ☐ Multiple sclerosis

4 ☐ Cerebral palsy

5 ☐ Spinal cord injury

6 ☐ Other (please specify):

9. In your academic preparation, did you receive any education on the use of occupational and/or physical therapy methods to manage spasticity?

1 ☐ No (Go to Question 10)

2 ☐ Yes

If yes, how much time was dedicated to therapeutic intervention?

1 ☐ 1 – 3 lectures

2 ☐ 4 – 6 lectures

3 ☐ 1 course

4 ☐ More than 1 course

10. In your academic preparation, did you receive any education on the use of medication and/or surgery to manage spasticity?

1 ☐ No (Go to Question 11)

2 ☐ Yes

If yes, how much time was dedicated to medical management of spasticity?

1 ☐ 1 – 3 lectures

2 ☐ 4 – 6 lectures

3 ☐ 1 course

4 ☐ More than 1 course

11. In your academic preparation, did you receive any education on outcome measures that can be used for spasticity management?

1 ☐ No (Go to Question 12)

2 ☐ Yes

If yes, how much time was dedicated to outcome measures?

1 ☐ 1 – 4 lectures

2 ☐ 5 – 8 lectures

3 ☐ 1 course

4 ☐ More than 1 course

12. Have you attended any continuing education events on spasticity management?

1 ☐ No (Go to Question 13)

2 ☐ Yes

If yes, when did you last attend a spasticity management course?

1 ☐ 0 – 2 years

2 ☐ 3 – 5 years

3 ☐ 6 – 8 years

4 ☐ Greater than 8 years

TEAM MANAGEMENT

13. Do you work or consult with other healthcare professionals to recommend or provide further medical management of spasticity beyond OT and PT interventions?

1 ☐ No (Go to Question 14)

2 ☐ Yes



If yes, what other healthcare professionals do you work or consult with? Check all that apply.

- | | |
|---|--|
| 1 <input type="checkbox"/> Psychiatrist | 7 <input type="checkbox"/> Physical therapist |
| 2 <input type="checkbox"/> Neurologist | 8 <input type="checkbox"/> Orthotist / Prosthetist |
| 3 <input type="checkbox"/> Orthopaedic surgeon | 9 <input type="checkbox"/> Nurse |
| 4 <input type="checkbox"/> Neurosurgeon | 10 <input type="checkbox"/> Social worker |
| 5 <input type="checkbox"/> General practitioner | 11 <input type="checkbox"/> Case management |
| 6 <input type="checkbox"/> Occupational therapist | 12 <input type="checkbox"/> Other: _____ |

14. Do you ever recommend that a client be referred to a physician for further medical management of spasticity as an adjunct to occupational or physical therapy?

1 ☐ No (Go to Question 15)

2 ☐ Yes



If yes, please check all areas where you provide recommendation(s):

- 1 ☐ Oral medications
- 2 ☐ Chemodenervation (e.g. Alcohol, BOTOX[®], MYOBLOC[™], and/or Phenol injections)
- 3 ☐ Intrathecal Baclofen[™] (ITB) Pump
- 4 ☐ Surgery
- 5 ☐ Other: _____

15. Which statement best describes your working relationship with your clients' physician for spasticity management?

1 ☐ The physician and I collaborate on spasticity management

2 ☐ The physician directs the spasticity management

3 ☐ I direct the physician on spasticity management

4 ☐ There is no working relationship between myself and the physician

16. On average, how long will you treat a client before asking the attending physician or consultant for a medication review of the spasticity treatment?

1 ☐ 2 to 3 weeks

2 ☐ 1 to 2 months

3 ☐ 3 to 5 months

4 ☐ 6 months

5 ☐ 1 year

6 ☐ Greater than one year

7 ☐ Other: _____

17. Are you hesitant to recommend that a client be referred to a physician for further medical management of spasticity?

1 ☐ No (Go to Question 18)

2 ☐ Yes



If yes, why are you hesitant? Check all that apply.

- 1 ☐ The physician does not share the same concern for spasticity.
- 2 ☐ The physician does not listen to my recommendations.
- 3 ☐ I am unsure of the permanent affects of drug interventions.
- 4 ☐ I have concern for cognitive decline with oral medications.
- 5 ☐ I am unsure of the physician's experience with spasticity management.
- 6 ☐ I prefer traditional therapy methods to medical intervention.
- 7 ☐ I am concerned about medication side effects.
- 8 ☐ Other: _____

18. Do you have any experience working with clients who have had a diagnostic 24 hour nerve block (i.e. Marcaine or Sensorcaine) to see if a client is a candidate for focal chemodenervation spasticity management?

1 ☐ No

2 ☐ Yes

19. Do you have any experience working with clients who have had chemodenervation for focal spasticity management?

1 ☐ No (Go to Question 20)

2 ☐ Yes



If yes, what method of chemodenervation? Check all that apply.

1 ☐ Alcohol

2 ☐ Botulinum Toxin A (BTX-A, BOTOX®)

3 ☐ Botulinum Toxin B (BTX-B, MYOBLOC™)

4 ☐ Phenol

20. In your experience, when does a routine referral for therapy (OT or PT) occur for clients receiving chemodenervation?

1 ☐ Routine referral before chemodenervation

2 ☐ Routine referral following chemodenervation

3 ☐ Occasional referral

4 ☐ No referral to therapy

5 ☐ No experience with this procedure

21. Please rate your agreement/disagreement with the following statement: Chemodenervation replaces traditional OT and PT intervention for spasticity management.

1 ☐ Agree

2 ☐ Moderately agree

3 ☐ Mildly agree

4 ☐ Mildly disagree

5 ☐ Moderately disagree

6 ☐ Disagree

22. Please rate your agreement/disagreement with the following statement: Chemodenervation manages spasticity so that occupational therapy or physical therapy may more effectively address the client's other clinical challenges.

1 ☐ Agree

2 ☐ Moderately agree

3 ☐ Mildly agree

4 ☐ Mildly disagree

5 ☐ Moderately disagree

6 ☐ Disagree

23. What influences your clinical reasoning when deciding to pursue further medical management of spasticity in addition to OT and PT intervention? Circle the corresponding number for each factor listed below.

Influence on Clinical Reasoning	1 Greatest influence	2 Moderate influence	3 Minimal influence	4 No influence
Age of client	1	2	3	4
Client's age at spasticity onset	1	2	3	4
Severity of spasticity	1	2	3	4
Location of spasticity (focal vs. generalized)	1	2	3	4
Client is not progressing with OT/PT	1	2	3	4
Client's pain status	1	2	3	4
Client's concern for cosmesis	1	2	3	4
Client's funding	1	2	3	4
Co-morbidities	1	2	3	4
Client's premorbid musculoskeletal status	1	2	3	4
Client's sleeping patterns	1	2	3	4
Other (please specify below):	1	2	3	4

OUTCOME MEASURES

24. In your clinical practice with clients who have spasticity, how do you evaluate **technical** goals? Please categorize each of the following measures according to the following descriptions:

Outcome Measures	1 Routinely used in my practice	2 Occasion ally used in my practice	3 Familiar with but do not use in my practice	4 Not familiar with this measure
Observation	1	2	3	4
Facility Developed Scale	1	2	3	4
Modified Ashworth Scale	1	2	3	4
Tardieu Scale	1	2	3	4
Degree of Adductor Muscle tone	1	2	3	4
Spasm Frequency Scale	1	2	3	4
Manual Muscle Testing	1	2	3	4
Goniometry	1	2	3	4
Fugyl-Meyer	1	2	3	4
Brunnstrum Motor Staging	1	2	3	4
Chedoke-MacMaster Stroke Scale	1	2	3	4
Motricity Index and Trunk control Test	1	2	3	4
Other (please specify below):	1	2	3	4

25. In your clinical practice with clients who have spasticity, how do you evaluate **functional** goals? Please categorize each of the following measures according to the following descriptions:

Outcome Measures	1 Routinely used in my practice	2 Occasional ly used in my practice	3 Familiar with but do not use in my practice	4 Not familiar with this measure
Observation	1	2	3	4
Facility Developed Scale	1	2	3	4
Jebson	1	2	3	4
Purdue Peg Board	1	2	3	4
9 Hole Peg test	1	2	3	4
Frenchay Arm Test	1	2	3	4
Timed Get Up and Go	1	2	3	4
Ambulation Index	1	2	3	4
Berg Balance Scale	1	2	3	4
Functional Ambulation Classification	1	2	3	4
Barthel Index	1	2	3	4
Functional Independence Measure (FIM)	1	2	3	4
Other (please specify below):	1	2	3	4

26. In your clinical practice with clients who have spasticity, how do you evaluate client's perception of his/her outcome? Please categorize each of the following measures according to the following descriptions:

Outcome Measures	1 Routinely used in my practice	2 Occasional ly used in my practice	3 Familiar with but do not use in my practice	4 Not familiar with this measure
Non-standardized Interview	1	2	3	4
Facility Developed Scale	1	2	3	4
SF 36 Health Survey (Rand)	1	2	3	4
Canadian Occupational Performance Measure (COPM)	1	2	3	4
Goal Attainment Scaling	1	2	3	4
Other (please specify below):	1	2	3	4

27. What influences your clinical reasoning when **choosing outcome measures** for a client experiencing spasticity? Circle the corresponding number for each factor listed below.

Influence on Clinical Reasoning	1 Greatest influence	2 Moderate influence	3 Minimal influence	4 No influence
Age of client	1	2	3	4
Client's age at spasticity onset	1	2	3	4
Severity of spasticity	1	2	3	4
Location of spasticity (focal vs. generalized)	1	2	3	4
Client is not progressing with OT/PT	1	2	3	4
Client's pain status	1	2	3	4
Client's concern for cosmesis	1	2	3	4
Client's funding	1	2	3	4
Co-morbidities	1	2	3	4
Client's premorbid musculoskeletal status	1	2	3	4
Client's sleeping patterns	1	2	3	4
Other (please specify below):	1	2	3	4

28. What other factors affect your choice of outcome measures for spasticity management? Please check all boxes that apply.

"I use outcome measures based on...

- ☐ 1 ... their availability at my facility."
☐ 2 ... approval by my client's funding source."
☐ 3 ... how comfortable and familiar I am with the measures."
☐ 4 ... how appropriate they are for my clients."
☐ 5 ... how long they will take to administer/complete."
☐ 6 ... how easy they are to use."
☐ 7 "I do not choose my outcome measures - they are chosen by my facility/ company."
☐ 8 Other: _____

29. Please rank the statements that you checked off in Question #28, by placing a number on the line beside each statement applicable to you. Start by ranking the most important factor as #1.

THERAPEUTIC MANAGEMENT

30. Which therapeutic management techniques best reflect the methods you would employ to manage your clients with upper motor neuron syndrome? Specifically, what interventions do you use to address the positive symptoms (e.g. spasticity), the negative symptoms (e.g. weakness/incoordination) and the rheological changes (e.g. stiffness, atrophy, fibrosis, and contracture) in spastic musculature? You may circle more than one number per therapeutic intervention.

Therapeutic Intervention	1 spasticity	2 negative symptoms	3 rheological changes	4 functional retraining	5 Do not use
Stretching	1	2	3	4	5
Strengthening	1	2	3	4	5
Closed Chain activities	1	2	3	4	5
Weightbearing	1	2	3	4	5
Open Chain Activities	1	2	3	4	5
Casting (Serial & Bivalve)	1	2	3	4	5
Splinting – Pre-Fabricated	1	2	3	4	5
Splinting – Custom-Made	1	2	3	4	5
Bracing	1	2	3	4	5
Seating and Positioning	1	2	3	4	5
KinesioTaping	1	2	3	4	5
NDT	1	2	3	4	5
Motor Learning	1	2	3	4	5
Constraint Induced Therapy	1	2	3	4	5
PNF	1	2	3	4	5
Neurodynamics	1	2	3	4	5
ADL / IADL Retraining in Contrived Environments	1	2	3	4	5
ADL / IADL Retraining in Real Environments	1	2	3	4	5
Fine Motor Retraining	1	2	3	4	5
Gait retraining	1	2	3	4	5
Adaptive Equipment Compensation	1	2	3	4	5
Biofeedback	1	2	3	4	5
EMS/NMES	1	2	3	4	5
Other (please specify below):	1	2	3	4	5

31. What influences your clinical reasoning when **selecting therapeutic interventions** for a client experiencing spasticity? Circle the corresponding number for each factor listed below.

Influence on Clinical Reasoning	1 Greatest influence	2 Moderate influence	3 Minimal influence	4 No influence
Age of client	1	2	3	4
Client's age at spasticity onset	1	2	3	4
Severity of spasticity	1	2	3	4
Location of spasticity (focal vs. generalized)	1	2	3	4
Client's pain status	1	2	3	4
Client's concern for cosmesis	1	2	3	4
Client's funding	1	2	3	4
Co-morbidities	1	2	3	4
Client's premorbid musculoskeletal status	1	2	3	4
Client's sleeping patterns	1	2	3	4
Other (please specify below):	1	2	3	4

32. What other factors affect your choice of therapeutic interventions for spasticity management? Please check all boxes that apply.

"I choose therapeutic interventions based on...

- ☐ 1 ... my clinical expertise."
☐ 2 ... whether the necessary equipment/expertise is available at my facility."
☐ 3 ... approval by my client's funding source."
☐ 4 ... how comfortable and familiar I am with them."
☐ 5 ... how appropriate they are for my clients."
☐ 6 ... how long they will take to administer/complete."
☐ 7 ... whether research supports their effectiveness."
☐ 8 ... how easy they are to use with my clients."
☐ 9 "I do not choose my therapeutic interventions - they are chosen by my facility/company."
☐ 10 Other: _____

33. Please rank the statements that you checked off in **Question #32**, by placing a number on the line beside each statement applicable to you. Start by ranking the most important factor as #1.

Case Vignettes

Please answer the following questions based upon your clinical experience, on how you would typically approach the management of the client's spasticity given each separate case.

Jane (Questions 34 - 37): For the purpose of Jane's questions, please consider that there are **no** medical complications that would preclude any of the listed interventions.

34. Jane is a 19-year-old college student who sustained a closed head injury from a motor vehicle accident and is admitted for inpatient rehabilitation. At **4 months** following the accident, she responds to yes and no questions accurately, and is now experiencing moderate to severe flexor synergy tone in her dominant upper extremity (UE), and extensor posturing in her right lower extremity (LE). Her UE spasticity is predominantly in her elbow flexors, forearm pronators, and long finger flexors, and her LE spasticity is predominantly in her plantar flexors and hip adductors. Please **rank order** your **top 5** intervention choices to address the moderate to severe spasticity in both her upper and lower extremities (i.e. rank 5 interventions for the upper extremity and 5 interventions for the lower extremity).

	UE	LE
1 Daily stretching program	___	___
2 Weightbearing exercises	___	___
3 Strengthening exercises	___	___
4 Custom thermoplastic splinting	___	___
5 NDT	___	___
6 Motor learning	___	___
7 Functional activity training	___	___
8 Constraint induced movement therapy	___	___
9 Serial casting	___	___
10 Bivalve casting	___	___
11 Referral for botulinum toxin (BTX-A or BTX-B)	___	___
12 Referral for phenol or alcohol injection	___	___
13 Pre-fabricated adjustable angle brace	___	___
14 Other: _____	___	___
15 Other: _____	___	___

- ☐ I am answering only part of this question, because I do not treat the upper extremity.
☐ I am answering only part of this question, because I do not treat the lower extremity.

35. Assume that Jane is now **8 months** following her closed head injury and is near discharge from the rehabilitation unit. She still has moderate to severe spasticity in her right upper extremity and lower extremity that is interfering with her ability to complete self-care and household ambulation. Would you choose a different pattern of therapy interventions to manage Jane's spasticity?

1 ☐ No

2 ☐ Yes



If yes, please rank order your top 5 intervention choices.

	UE	LE
1 Daily stretching program	_____	_____
2 Weightbearing exercises	_____	_____
3 Strengthening exercises	_____	_____
4 Custom thermoplastic splinting	_____	_____
5 NDT	_____	_____
6 Motor learning	_____	_____
7 Functional activity training	_____	_____
8 Constraint induced movement therapy	_____	_____
9 Serial casting	_____	_____
10 Bivalve casting	_____	_____
11 Referral for botulinum toxin (BTX-A or BTX-B)	_____	_____
12 Referral for phenol or alcohol injection	_____	_____
13 Pre-fabricated adjustable angle brace	_____	_____
14 Other: _____	_____	_____
15 Other: _____	_____	_____

☐ I am answering only part of this question, because I do not treat the upper extremity.

☐ I am answering only part of this question, because I do not treat the lower extremity.

36. Consider now that you are seeing Jane **one year** after her initial injury as an outpatient. Jane is now a functional household ambulator, but still has great difficulty with moderate spasticity in her plantar flexors and has skin breakdown on her malleoli from inverting in her articulated ankle foot orthosis during gait. Jane also still has moderate spasticity in her right upper extremity that limits the active and isolated extension movement she has in at all UE joints. Would you choose a different pattern of therapy interventions to manage Jane's spasticity?

1 ☐ No

2 ☐ Yes



If yes, please rank order your top 5 intervention choices.

	UE	LE
1 Daily stretching program	_____	_____
2 Weightbearing exercises	_____	_____
3 Strengthening exercises	_____	_____
4 Custom thermoplastic splinting	_____	_____
5 NDT	_____	_____
6 Motor learning	_____	_____
7 Functional activity training	_____	_____
8 Constraint induced movement therapy	_____	_____
9 Serial casting	_____	_____
10 Bivalve casting	_____	_____
11 Referral for botulinum toxin (BTX-A or BTX-B)	_____	_____
12 Referral for phenol or alcohol injection	_____	_____
13 Pre-fabricated adjustable angle brace	_____	_____
14 Other: _____	_____	_____
15 Other: _____	_____	_____

☐ I am answering only part of this question, because I do not treat the upper extremity.

☐ I am answering only part of this question, because I do not treat the lower extremity.

37. Consider now that you are seeing Jane two years after her initial injury for an outpatient follow-up visit. Jane's physical status has not changed since Question #36. However Jane is concerned with her cosmesis when she is out in public places. Jane is now attending one university class and is greatly concerned with fitting in with her peers. She does not like how other people respond to her when her arm pulls up in a flexor synergy pattern. Additionally, she is still having difficulty with her ankle brace and speed of gait.

Would you choose a different pattern of therapy interventions to manage Jane's spasticity?

1 ☐ No

2 ☐ Yes



If yes, please rank order your top 5 intervention choices.

	UE	LE
1 Daily stretching program	—	—
2 Weightbearing exercises	—	—
3 Strengthening exercises	—	—
4 Custom thermoplastic splinting	—	—
5 NDT	—	—
6 Motor learning	—	—
7 Functional activity training	—	—
8 Constraint induced movement therapy	—	—
9 Serial casting	—	—
10 Bivalve casting	—	—
11 Referral for botulinum toxin (BTX-A or BTX-B)	—	—
12 Referral for phenol or alcohol injection	—	—
13 Pre-fabricated adjustable angle brace	—	—
14 Other: _____	—	—
15 Other: _____	—	—

☐ I am answering only part of this question, because I do not treat the upper extremity.

☐ I am answering only part of this question, because I do not treat the lower extremity.

John (Questions 38 - 40): For the purpose of John's questions, there are no medical constraints that would preclude any of the treatment choices listed.

38. John is a 65-year-old retired male who experienced a right middle cerebral artery stroke. At 2 months following his stroke, he has moderate to severe flexor synergy tone in his dominant upper left extremity (UE), and extensor posturing in his left lower extremity (LE). His UE spasticity is predominantly in his forearm pronators, long finger flexors and shoulder internal rotators/adductors. John's LE spasticity is predominantly in his plantar flexors and hip adductors. John's functional status is limited by his spasticity, and he currently requires moderate to maximal assistance for all self care and gait. John is to be discharged to home with his supportive wife in four weeks. Please rank order your top 5 intervention choices to address the moderate to severe spasticity in his upper and lower extremities.

	UE	LE
1 Daily stretching program	—	—
2 Weightbearing exercises	—	—
3 Strengthening exercises	—	—
4 Custom thermoplastic splinting	—	—
5 NDT	—	—
6 Motor learning	—	—
7 Functional activity training	—	—
8 Constraint induced movement therapy	—	—
9 Serial casting	—	—
10 Bivalve casting	—	—
11 Referral for botulinum toxin (BTX-A or BTX-B)	—	—
12 Referral for phenol or alcohol injection	—	—
13 Pre-fabricated adjustable angle brace	—	—
14 Other: _____	—	—
15 Other: _____	—	—

☐ I am answering only part of this question, because I do not treat the upper extremity.

☐ I am answering only part of this question, because I do not treat the lower extremity.

39. Assume that John is now 8 months following his stroke. He still has moderate spasticity in his left upper extremity and lower extremity that is interfering with his ability to be independent in self-care and household ambulation.

Would you now choose a different pattern of therapy interventions to manage John's spasticity?

1 ☐ No

2 ☐ Yes



If yes, please rank order your top 5 intervention choices.

	UE	LE
1 Daily stretching program	_____	_____
2 Weightbearing exercises	_____	_____
3 Strengthening exercises	_____	_____
4 Custom thermoplastic splinting	_____	_____
5 NDT	_____	_____
6 Motor learning	_____	_____
7 Functional activity training	_____	_____
8 Constraint induced movement therapy	_____	_____
9 Serial casting	_____	_____
10 Bivalve casting	_____	_____
11 Referral for botulinum toxin (BTX-A or BTX-B)	_____	_____
12 Referral for phenol or alcohol injection	_____	_____
13 Pre-fabricated adjustable angle brace	_____	_____
14 Other: _____	_____	_____
15 Other: _____	_____	_____

☐ I am answering only part of this question, because I do not treat the upper extremity.

☐ I am answering only part of this question, because I do not treat the lower extremity.

40. Consider now that John has been referred for outpatient therapy two years after his initial stroke. John is now independent with all ADL/IADL and can walk short distances with a single point cane. John still has difficulty with moderate spasticity in his plantar flexors and ankle brace tolerance. He has had several revisions to his brace and still has breakdown on the dorsum of his foot and malleoli due to toe clawing and inversion inside his articulated ankle foot orthosis. John also still has mild to moderate spasticity in his left shoulder adductors/internal rotators, pronators and long finger flexors. This UE pattern places his hand in a position that embarrasses him when he is out walking in the community.

Would you choose a different pattern of therapy interventions to manage John's spasticity?

1 ☐ No

2 ☐ Yes



If yes, please rank order your top 5 intervention choices.

	UE	LE
1 Daily stretching program	_____	_____
2 Weightbearing exercises	_____	_____
3 Strengthening exercises	_____	_____
4 Custom thermoplastic splinting	_____	_____
5 NDT	_____	_____
6 Motor learning	_____	_____
7 Functional activity training	_____	_____
8 Constraint induced movement therapy	_____	_____
9 Serial casting	_____	_____
10 Bivalve casting	_____	_____
11 Referral for botulinum toxin (BTX-A or BTX-B)	_____	_____
12 Referral for phenol or alcohol injection	_____	_____
13 Pre-fabricated adjustable angle brace	_____	_____
14 Other: _____	_____	_____
15 Other: _____	_____	_____

☐ I am answering only part of this question, because I do not treat the upper extremity.

☐ I am answering only part of this question, because I do not treat the lower extremity.

41. Did you choose the same therapeutic intervention progression of spasticity management in both Jane and John's cases?

1 ☐ Yes

2 ☐ No



If No, please rank order the top 3 reasons why you chose different interventions.

1 ____ I chose different interventions because of the age difference.

2 ____ I chose different interventions because of the average expected prognosis for their different medical diagnoses.

3 ____ I chose different interventions because there was a longer time frame to treat Jane.

4 ____ I chose different interventions because of the different functional limitations.

5 ____ Other:

Thank you very much for taking the time and effort to complete this survey!

We truly appreciate it.

Please fold this survey along the dotted line and return it in the enclosed addressed envelope.

Thank you!

Appendix B



Dalhousie University

**OFFICE OF RESEARCH
ETHICS ADMINISTRATION**

Office of Research Services

321 Henry Hicks Academic Administration Building
Halifax, Nova Scotia
Canada B3H 4H6
Tel: (902) 494-6513
Fax: (902) 494-1595

Health Sciences Human Research Ethics Board Letter of Approval

Date: June 30, 2003.

To: Diane MacKenzie, School of Occupational Therapy

The Health Sciences Research Ethics Board has examined the following application for research involving human subjects:

Project # 2003-646

Title: Current Trends in the Therapeutic Management and Outcome Measurement of Clients With Spasticity : The Occupational and Physical Therapy Perspective

Submitted by: Diane MacKenzie, School of Occupational Therapy

and found the proposed research involving human subjects to be in accordance with Dalhousie Guidelines and the Tricouncil Policy Statement on *Ethical Conduct in Research Using Human Subjects*. This approval will be in effect for 12 months from the date indicated below.

Dalhousie Guidelines require that, on the anniversary of the effective date you must submit an annual report. Also, should there be any significant changes to either the research methodology, or the consent form used during the approval period, these changes must be submitted for ethics review. You must also notify the Office of Human Research Ethics and Integrity when the project is completed or terminated.

This letter is the official record of ethics approval by the Dalhousie Health Sciences Research Ethics Board. You may use this letter to notify funding agencies that your project has undergone a thorough review and has been granted ethics approval.

Effective Date: June 23, 2003.

signed: 

Conrad Fernandez (Chair HSHREB)

Copy sent to: ☒ Graduate Studies ☒ Research Services
Project funding (if any) Agency - Allergan Awarded

Appendix C



University Research Ethics Board

UNIVERSITY RESEARCH ETHICS BOARD

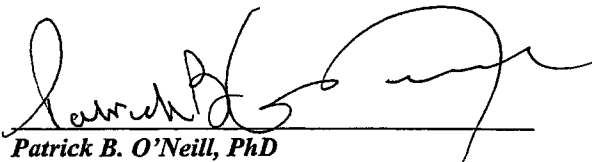
Certificate of Ethics Approval

Title of project: *Investigating Influences on the Current Trends in Occupational and Physical Therapy Management of Clients Experiencing Spasticity*

Researcher(s): Diane MacKenzie/ Joseph Murphy, Supervisor

This document confirms that the above named study has been approved in accordance with the *Tri-Council Policy Statement* as outlined in the *MSVU Policies and Procedures: Ethical Review of Research Involving Humans*.

This certificate is valid one year from the date of issue. Renewal is contingent upon submission to the UREB of a satisfactory annual ethics report.


Patrick B. O'Neill, PhD
Acting Chair, UREB

June 30, 2004
Date

Halifax Nova Scotia B3M 2J6 Canada
Tel 902 457 6296/6350 • Fax 902 457 2174
www.msvu.ca

Appendix D

August , 2003

Dear Therapist;

We invite you to participate in a research study being conducted out of Dalhousie University (Halifax, NS, Canada). The study, entitled **“Current Therapeutic Trends in the Management of Clients with Spasticity,”** aims to examine the spasticity management methods currently used by occupational and physical therapists across Canada and the United States. We hope that the results of this study will ultimately help to establish guidelines for ‘best practice’ in the therapeutic management of spasticity.

We ask you to make this valuable contribution to your profession, by spending about twenty minutes to complete the enclosed survey. The survey is ***completely confidential and anonymous***, and we have enclosed a pre-stamped return envelope for your use. As you will notice, there is a number on the top left-hand corner of the envelope. This number identifies you as the sender, so that we will know not to send you any reminder letters. When we receive your survey in the mail, we will record the envelope number on a separate sheet (not on the survey), and we will discard the envelope. In this way, we will know that you have responded, but we will not know which completed survey is yours.

If you choose to participate in our research, you may skip questions that you do not want to answer. We realize that some questions may cause you to feel tentative about the clinical decision making process with spasticity management. Please note that we cannot assure any direct personal benefit as a result of participation in this study. If you choose not to participate, we assure you that no personal negative consequences will result because of your decision.

In the interest of protecting your anonymity and confidentiality, please note that we are not requesting that you sign a consent form. However, ***if you complete and return this survey, we are assuming that you have given us your consent to use your responses as research data.*** All research materials, including completed surveys and lists of participants, will be kept in a locked filing cabinet that only I and my research assistant can access. The list of participants will be destroyed once we have completed all of the mailings. The completed surveys will be destroyed five years after we have published our study results. At no time will your name appear in any publications or presentations associated with this research. ***If you choose to participate in this study, please retain this letter for your records.***

If you have any questions about this study, please feel free to contact me at (902) 494-2612 or diane.mackenzie@dal.ca. If you would like to speak to someone else about your concerns regarding this study, you may contact the Integrity Counsellor at Dalhousie University’s Office of Human Research Ethics and Integrity at (902) 494-1462.

Thank you in advance for your time and your contribution!

Sincerely,

Diane MacKenzie, OTReg(NS)
Principal Investigator

Note: This study is sponsored by Allergan. While Allergan may have an interest in better understanding therapists’ spasticity management practices, Allergan has not exerted any influence on this research proposal, the survey’s content, nor has it imposed any restrictions regarding the publication of results.

Appendix E

August 27, 2003

Dear Therapist,

Re: "Current Therapeutic Trends in the Management of Clients with Spasticity"

About two weeks ago, we sent you our survey and a brief description of our research on spasticity management among occupational therapists and physical therapists. I am writing this letter to you as a gentle reminder to mail us your completed survey. If you have already returned your completed survey, I thank you for your participation.

While we are asking that you volunteer about twenty minutes of your time to complete the survey, we emphasize that by participating in this study, you will be making a significant contribution to your profession. The knowledge gained through this research will allow us to gather the current trends in how therapists are approaching spasticity management. This information will not only assist in the development of best practice guidelines for clients with spasticity, it will also assist with gathering information for university instruction and continuing education, for both occupational therapists and physical therapists. These improvements will benefit not only you and your colleagues, but your clients as well.

If you have any questions about this study, please feel free to contact me at (902) 494-2612 or diane.mackenzie@dal.ca. If you would like to speak to someone else about your concerns regarding this study, you may contact the Integrity Counsellor at Dalhousie University's Office of Human Research Ethics and Integrity at (902) 494-1462.

Thank you in advance for your time and your contribution!

Sincerely,

Diane MacKenzie, OTReg(NS)
Principal Investigator

Appendix F

September 11, 2003

Dear Therapist,

Re: "Current Therapeutic Trends in the Management of Clients with Spasticity"

About four weeks ago, we sent you our survey and a brief description of our research. In case you haven't yet mailed us your completed survey, we are sending you this second reminder letter. We are also enclosing another copy of the survey and the original cover letter, as well as a pre-stamped return envelope for your convenience.

We understand that you lead a busy life, with multiple and at times conflicting responsibilities. Why should take time out of your day to participate in yet another research project? Our answer is two-fold.

The first reason is this: There is simply not enough research out there to guide therapists through the various spasticity management options – what they are, when they are appropriate, what the current debates are, and so on. This study is the first attempt to examine what spasticity management methods therapists currently use, how and when we use them, why we use them, why we don't use them. This study will attempt to gather information on the decision-making process surrounding spasticity management. It may help us identify barriers to effective spasticity management – and once we have identified these barriers, we are that much closer to overcoming them.

Our second reason is: We would like to receive as many responses as possible so that the results may be used to interpret a meaningful outcome. We encourage you to respond so that your information will help us construct a picture of spasticity management practices among the diverse occupational and physical therapy practices across North America.

Again, we emphasize that your responses will be completely anonymous and confidential. While we will have a list of therapists who completed the survey, there will be no way of matching therapists with their responses. Once we have completed all the mailings, we will destroy the list of participants.

If you have any questions about this study, please feel free to contact me at (902) 494-2612 or diane.mackenzie@dal.ca. If you would like to speak to someone else about your concerns regarding this study, you may contact the Integrity Counsellor at Dalhousie University's Office of Human Research Ethics and Integrity at (902) 494-1462.

Thank you in advance for your time and your contribution!

Sincerely,

Diane MacKenzie, OTReg(NS)
Principal Investigator

Appendix G

September 26, 2003

Dear Therapist,

Re: "Current Therapeutic Trends in the Management of Clients with Spasticity"

About six weeks ago, we sent you our survey and a brief description of our research. In case you were unable to find, or complete the first survey, we re-sent the survey printed on green paper about two weeks ago. If you haven't yet had a chance to mail us your completed survey, we are sending you this final reminder letter. We would like to encourage you to complete and return the survey by October 31, 2003.

We are quite aware that you lead very busy lives both at work and with several other responsibilities. However, we think that your completed survey will make a worthwhile contribution to the profession and, ultimately, to the care of clients and patients.

Again, we remind you that your responses will be completely anonymous and confidential.

If you have any questions about this study, please feel free to contact me at (902) 494-2612 or diane.mackenzie@dal.ca. If you would like to speak to someone else about your concerns regarding this study, you may contact the Integrity Counsellor at Dalhousie University's Office of Human Research Ethics and Integrity at (902) 494-1462.

Thank you in advance for your time and your contribution!

Sincerely,

Diane MacKenzie, OTReg(NS)
Principal Investigator

References

- Ade-Hall, R. A., & Moore, A. P. (2000). Botulinum toxin type A in the treatment of lower limb spasticity in cerebral palsy. *Cochrane Database Systematic Reviews*, 2000 (2)(CD001408).
- Ahrendt, L. (2001). Managing severe spasticity with intrathecal baclofen therapy. *Inside Case Management*, 7(11), 5-9.
- Aitken, L. M. (2002). Critical Care nurses' use of decision-making strategies. *Journal of Clinical Nursing*, 12, 476-483.
- Albany, K. (1997). Physical and occupational therapy considerations in adult patients receiving botulinum toxin injections for spasticity. *Muscle Nerve Suppl*, 6, S221-231.
- APTA. (2003). *Professionalism in Physical Therapy: Core Values*. Retrieved March 12, 2006
- Asch, D. A., Jedrzejewski, M. K., & Christakis, N. A. (1997). Response rates to mail surveys published in medical journals. *Journal of Clinical Epidemiology*, 50(10), 1129-1136.
- Bailey, D. M. (1997). Analyzing quantitative data. In *Research for the Health Professional: A Practical Guide* (2nd ed., pp. 119-133). Philadelphia, PA: F.A. Davis Company.
- Bhakta, B. B. (2000). Management of spasticity in stroke. *Br Med Bull*, 56(2), 476-485.
- Bohannon, R. W. (1990). Information accessing behaviour of physical therapists. *Physiotherapy Theory Practice*, 6, 215-225.
- Boyd, R. N., & Hays, R. M. (2001). Current evidence for the use of botulinum toxin type A in the management of children with cerebral palsy: A systematic review. *European Journal of Neurology*, 8(suppl. 5), 1-20.
- Boyd, R. N., Morris, M. E., & Graham, H. K. (2001). Management of upper limb dysfunction in children with cerebral palsy: A systematic review. *European Journal of Neurology*, 8(suppl. 5), 150-166.
- Brin, M. F., & Group, t. S. S. (1997). Dosing, administration, and a treatment algorithm for use of botulinum toxin A for adult-onset spasticity. *Muscle Nerve*, 20(suppl 6), S208-S220.
- Broberg, C., Aars, M., Beckmann, K., Emaus, N., Lehto, P., Lahtenmaki, M., et al. (2003). A conceptual framework for curriculum design in physiotherapy education - an international perspective. *Advances in Physiotherapy*, 5(4), 161-168.
- Bucknall, T. (2000). Critical care nurses' decision-making activities in the natural clinical setting. *Journal of Clinical Nursing*, 9, 25-36.
- Bucknall, T. (2003). The clinical landscape of critical care: nurses' decision-making. *Journal of Advanced Nursing*, 43(3), 310-319.
- Bucknall, T., & Thomas, S. (1996). Clinical Decision Making in critical care. *Australian Journal of Advanced Nursing*, 13, 10-17.
- Burridge, J. H., Wood, D. E., Hermens, H. J., Voerman, G. E., Johnson, G. R., Van Wijck, F., et al. (2005). Theoretical and methodological considerations in the measurement of spasticity. *Disability and Rehabilitation*, 27, 69-80.
- Canadian Stroke Network Fact Sheet. Retrieved January 13, 2004, from <http://www.canadianstrokenetwork.ca/media/downloads/fact.sheet.e.pdf>

- CAOT. (1999). *Joint Position Statement on evidence-based occupational therapy*. Retrieved March 23, 2004, from <http://www.caot.ca/default.asp?ChangeID=166&pageID=156>
- Carr, J. H., & Shepherd, R. B. (1982). *A motor relearning programme for stroke* (1st Edition ed.). London: Heinemann Medical.
- Chiarello, L. A., O'Neil, M., Gildenberg Dichtner, C., Westcott, S., Orlin, M., Marchese, V., et al. (2005). Exploring physical therapy clinical decision making for children with spastic diplegia: survey of pediatric practice. *Pediatric Physical Therapy*, 17, 46-54.
- CPA. (2005a). *CPA Divisions*. Retrieved March 11, 2006, from <http://www.physiotherapy.ca/divisions.htm>
- CPA. (2005b). *Evidence Based Practice*. Retrieved March 12, 2006, from <http://www.physiotherapy.ca/evidencebased.htm>
- Creedon, S. D., Kijkers, M. P. J., & Hinderer, S. R. (1997). Intrathecal baclofen for severe spasticity: A meta-analysis. *International Journal of Rehabilitation and Health*, 3(3), 171-185.
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks: Sage.
- CSN. (2004). *Canadian Stroke Network Fact Sheet*. Retrieved January 13, 2004, from <http://www.canadianstrokenetwork.ca/media/downloads/fact.sheet.e.pdf>
- Curtin, M., & Jaramazovic, E. (2001). Occupational therapists' view and perception of evidence-based practice. *British Journal of Occupational Therapy*, 64, 214-222.
- Damiano, D. (2001). Teaching effective ways to examine and treat spasticity and weakness and their effects on motor function. *Neurology Report*, 25(3), 98-101.
- Davis, D., Evans, M., Jada, A., Perrier, L., Rath, D., Ryan, D., et al. (2003). The case for knowledge translation: shortening the journey from evidence to effect. *BMJ*, 327, 33-35.
- Davis, M., Karunathilake, I., & Harden, R. M. (2005). AMEE Education Guide no. 28: the development and role of departments of medical education. *Medical Teacher*, 27(8), 665-675.
- Dechairo-Marino, A. E., Jordan-Marsh, M., Traiger, G., & Saulo, M. (2001). Nurse/physician collaboration: action research and the lessons learned. *J Nurs Adm*, 31(5), 223-232.
- Dillman, D. A. (1978). *Mail and Telephone Surveys: The Total Design Method*. New York, NY: Wiley-Interscience.
- Dubouloz, D. J., Egan, M., Vallerand, J., & von Zweck, C. (1999). Occupational therapists' perceptions of evidenced based practice. *The American Journal of Occupational Therapy*, 53, 445-453.
- Dudgeon, B. J., Libby, A. K., McLaughlin, J. F., Hays, R. M., Bjornson, K. F., & Roberts, T. S. (1994). Prospective measurement of functional changes after selective dorsal rhizotomy. *Archives of Physical Medicine and Rehabilitation*, 75(1), 46-53.
- Dumas, H. M., O'Neil, M. E., & Fragala, M. A. (2001). Expert consensus on physical therapist intervention after botulinum toxin A injection for children with cerebral palsy. *Physical Therapy*, 13, 122-132.

- Duncan, P., Richards, L., Wallace, D., Stoker-Yates, J., Pohl, P., Luchies, C., Ogle, A., and Studenki, S. (1998). A randomized, controlled pilot study of a home-based exercise program for individuals with mild and moderate stroke. *Stroke*, 29, 2055-2060.
- Edwards, I., Jones, M., Higgs, J., Trede, F., & Jensen, G. M. (2004). What is Collaborative Reasoning? *Advances in Physiotherapy*, 6, 70-83.
- Fleming, M. H. (1991). Clinical reasoning in medicine compared with clinical reasoning in occupational therapy. *Am J Occup Ther*, 45(11), 988-996.
- Foongchomcheay, A., Ada, L., & Canning, C., G. (2005). Use of devices to prevent subluxation of the shoulder after stroke. *Physiotherapy Research International*, 10(3), 134-145.
- Fowler, F. J. (1993). *Survey Research Methods* (2nd ed.). Newbury Park, CA: SAGE Publications Inc.
- Gillen, G. (1998). Managing abnormal tone after brain injury. *OT Practice*, 3(8), 18-24.
- Gormley, M. E. J. (2001). Treatment of neuromuscular and musculoskeletal problems in cerebral palsy. *Pediatric Rehabilitation*, 4(1), 5-16.
- Grimshaw, J. M., & Eccles, M. P. (2004). Is evidenced-based implementation of evidence-based care possible? *MJA*, 180, S50-51.
- Grol, R., & Wensing, M. (2004). What drives change? Barriers to and incentives for achieving evidence-based practice. *MJA*, 180, S57-60.
- Groves, L., Shellenberger, M. K., & Davis, C. S. (1998). Tizanidine treatment of spasticity: A meta-analysis of controlled, double-blind, comparative studies with baclofen and diazepam. *Advanced Therapeutics*, 15(4), 241-251.
- Hallett, C. E., Austin, L., Caress, A., & Luker, K. (2000). Wound care in the community setting: clinical decision making in context. *Journal of Advanced Nursing*, 31(4), 783-793.
- Hedberg, B., & Larsson, U. S. (2003). Observations, confirmations and strategies - useful tools in decision-making process for nurses in practice? *Journal of Clinical Nursing*, 12, 215-222.
- Hedberg, B., & Larsson, U. S. (2004). Environmental elements affecting the decision-making process in nursing practice. *Journal of Clinical Nursing*, 13, 316-324.
- Hoffman, K., Donoghue, J., & Duffield, C. (2004). Decision-making in clinical nursing: investigating contributing factors. *Journal of Advanced Nursing*, 45(1), 53-62.
- ICHE. (2002). Management of Spasticity in Adults: Grant Rounds Initiative for PTs/OTs. *On Focus on an interdisciplinary approach* [CD-ROM].
- Impact of Stroke*. Retrieved January 13, 2004, from <http://www.strokeassociation.org/presenter.jhtml?identifier=1033>
- Inman, C. (1999). Effectiveness of spinal cord injury rehabilitation. *Clinical Rehabilitation*, 13(suppl. 1), 25-31.
- Jensen, G. M., Gwyer, J., Shepard, K. F., & Hack, L. M. (2000). Expert practice in physical therapy. *Physical Therapy*, 80(1), 28-43.
- Jette, D. U., Grover, L., & Keck, C. P. (2003). A qualitative study of clinical decision making in recommending discharge placement from the acute care setting. *Phys Ther*, 83(3), 224-236.

- Jette, D. U., Latham, N. K., Smout, R. J., Gassaway, J., Slavin, M. D., & Horn, S. D. (2005). Physical therapy interventions for patients with stroke in inpatient rehabilitation facilities. *Physical Therapy*, 85(3), 238-248.
- Keilhofner, G. (2005). Research Concepts in Clinical Scholarship - Scholarship and practice: bridging the divide. *American Journal of Occupational Therapy*, 59(2), 231-239.
- Kent, R. M., Gilbertson, L., & Geddes, J. M. L. (2002). Orthotic devices for abnormal limb posture after stroke or non-progressive cerebral causes of spasticity (Protocol). *The Cochrane Database of Systematic Reviews*, 2002(Issue 3. Art. No.: CD003694), DOI: 10.1002/14651858.CD14003694.
- LaBan, M. M., Martin, T., Pechur, J., & Sarnacki, S. (1998). Physical and occupational therapy in the treatment of patients with multiple sclerosis. *Physical Medicine and Rehabilitation Clinics of North America*, 9(3), 603-614.
- Lance, J. W. (1980). The control of muscle tone, reflexes, and movement: Robert Wartenberg Lecture. *Neurology*, 30(12), 1303-1313.
- Law, M., & Phelp, I. (2002). Evidence based rehabilitation: a guide to practice. In M. Law (Ed.), (pp. 97-107). Thorofare, NJ: Slack.
- Loisel, P., Flardeau, M., Baril, R., Jose-Durand, M., Langely, A., Sauve, S., et al. (2005). The values underlying team decision-making in work rehabilitation for musculoskeletal disorders. *Disability and Rehabilitation*, 27(10), 561-569.
- Lysaght, R. M., Altschulyld, J. W., Grant, J. K., & Henderson, J. L. (2001). Variables affecting competency maintenance behaviour of occupational therapists. *American Journal of Occupational Therapy*, 55, 28-35.
- Mangione, T. W. (1995). *Mail Surveys: Improving the Quality*. Thousand Oaks, CA: SAGE Publications Inc.
- Mattingly, C. (1991). What is clinical reasoning? *Am J Occup Ther*, 45(11), 979-986.
- Mayer, N. H. (2004). Choosing upper limb muscles for focal intervention after traumatic brain injury. *J Head Trauma Rehabil*, 19, 119-142.
- Mayer, N. H., Esquenazi, A., & Childers, M. K. (1997). Common patterns of clinical motor dysfunction. *Muscle Nerve*, 20(suppl 6), S21-S35.
- McCormack, B., Kitson, A., Harvey, G., Rycroft-Malone, J., Titchen, A., & Seers, K. (2002). Getting evidence into practice: the meaning of 'context'. *J Adv Nurs*, 38(1), 94-104.
- McGuire, J. R., & Harvey, R. L. (1999). The prevention and management of complications after stroke. *Phys Med Rehabil Clin N Am*, 10(4), 857-874, ix.
- McLaughlin, J., Bjornson, K., Temkin, N., Steinbok, P., Wright, V., Reiner, A., et al. (2002). Selective dorsal rhizotomy: Meta-analysis of three randomized controlled trials. *Developmental Medicine in Child Neurology*, 44(1), 17-25.
- Neistadt, M. E. (1996). Teaching strategies for the development of clinical reasoning. *Am J Occup Ther*, 50(8), 676-684.
- O'Dwyer, N. J., Ada, L., & Neilson, P. D. (1996). Spasticity and muscle contracture following stroke. *Brain*, 119 (Pt 5), 1737-1749.
- Pain, K., Magill-Evans, J., Darrah, J., Hagler, P., & Warren, S. (2004). Effects of profession and facility type on research utilization by rehabilitation professionals. *Journal of Allied Health*, 33, 3-9.

- Paisley, S., Beard, S., Hunn, A., & Wight, J. (2002). Clinical effectiveness of oral treatments for spasticity in multiple sclerosis: A systematic review. *Multiple Sclerosis*, 8(4), 319-329.
- Panel, C. (2001). *Consensus Panel on the Management of the Hemiplegic Arm and Hand*. Retrieved March 11, 2006, from <http://209.5.25.171/ClientImages/1/PostStrokeArmandHandFinal2002.pdf>
- Pollock, A., Baer, G., Pomeroy, V., & Langhorne, P. (2003). Physiotherapy treatment approaches for the recovery of postural control and lower limb function following stroke (Review). *The Cochrane Database of Systematic Reviews*, 2003(Issue 2. Art. No.:CD001920), DOI: 10.1002/14651858.CD14001920.
- Press, W. H., Flannery, B. P., Teukolsky, S. A., & Vetterling, W. T. (1986). *Numerical Recipes: The Art of Scientific Computing*. In (pp. 1986). New York: Cambridge University Press.
- Rappolt, S. (2003). The role of professional expertise in evidence-based occupational therapy. *The American Journal of Occupational Therapy*, 57(5), 589-593.
- Rappolt, S., & Tassone, M. (2002). How Rehabilitation therapists gather, evaluate and implement new knowledge. *The Journal of Continuing Education in the Health Professions*, 22, 170-180.
- Rice-Oxley, M., & Turner-Stokes, L. (1999). Effectiveness of brain injury rehabilitation. *Clinical Rehabilitation*, 13(1), 7-24.
- Richardson, D. (2002). Physical therapy in spasticity. *Eur J Neurol*, 9 Suppl 1, 17-22; discussion 53-61.
- Riley, M. E. (2003). Removing chest drains - a critical reflection of a complex clinical decision. *Nursing in Critical Care*, 8(5), 212-221.
- Sackett, D. L., Rosenberg, W. M. C., Muir Gray, J. A., Haynes, R. B., & Richardson, W. S. (1996). Evidence-based medicine: what it is and what it isn't. *British Medical Journal*, 312, 71-72.
- Sample Size Calculator*. Retrieved May, 2003, from <http://www.surveysystem.com/sscalc.htm>
- Sampson, F. C., Haywood, A., Evans, G., Morton, R., & Collett, B. (2002). Functional benefits and cost/benefit analysis of continuous intrathecal baclofen infusion for the management of severe spasticity. *Journal of Neurosurgery*, 96(6), 1052-1057.
- Scanlan, S. M., & McGuire, J. (1998). Effective collaboration between physician and occupational therapist in the management of upper limb spasticity after stroke. *Topics in Stroke Rehabilitation*, 4(4), 1-13.
- Scheaffer, R. L., Mendenhall, W., & Ott, L. (1990). *Elementary Survey Sampling* (5th ed.). Belmont, CA: Duxbury Press.
- Shakespeare, D. T., Boggild, M., & Young, C. (2003). Anti-spasticity agents for multiple sclerosis. *Cochrane Database Systemic Reviews*, 2003(Issue 4. Art. No.: CD001332), DOI: 10.1002/14651858.CD14001332.
- Shakespeare, D. T., Boggild, M., & Young, C. (2004). Anti-spasticity agents for multiple sclerosis (Cochrane Review). *The Cochrane Library*(2), CD001332.
- Sirtori, V., Fatti, R., & Davide, C. (2003). Constraint induced movement therapy for upper extremities in stroke patients (Protocol). *The Cochrane Database of Systematic Reviews*, 2003(Issue 4. Art. No: CD004433), DOI: 10.1002/14651858.CD14004433.

- Sommerfeld, D. K., Eek, E. U., Svensson, A. K., Holmqvist, L. W., & Von Arbin, M. H. (2004). Spasticity After Stroke: Its Occurrence and Association With Motor Impairments and Activity Limitations. *Stroke*, 35(1), 134-139.
- Steultjens, E. M. J., Dekker, J., Bouter, L. M., Cardol, M., Van de Nes, J. C. M., & Van den Ende, C. H. M. (2003). Occupational therapy for multiple sclerosis. *The Cochrane Database of Systematic Reviews*, 2003(Issue 3. Art.No.: CD0036808), DOI: 10.1002/14651858.CD14003608.
- Sweetland, J., & Craik, C. (2001). The use of evidence-based practice by occupational therapists who treat adult stroke patients. *British Journal of Occupational Therapy*, 64, 256-260.
- Taricco, M., Adone, R., Pagliacci, C., & Telaro, E. (2000). Pharmacological interventions for spasticity following spinal cord injury. *Cochrane Database Systematic Reviews*, 2000(Issue 2. Art.No.:CD001131), DOI: 10.1002/14651858.CD14001131.
- Teasell, R., Foley, N., Salter, K., Bhogal, S., Bayona, N., Jutai, J., et al. (2005). *Evidence Based Review of Stroke Rehabilitation*. London, ON: Departments of Physical Medicine and Rehabilitation, St. Joseph Health Care, Parkwood Hospital and Epidemiology and Biostatistics, University of London, ON.
- Thompson, C. (2003). Clinical experience as evidence in evidence-based practice. *Journal of Advanced Nursing*, 43(3), 230-237.
- Thomson O'Brien, M. A., Freemantle, N., Oxman, A. D., Wolf, F., Davis, D. A., & Herrin, J. (2001). Continuing education meetings and workshops: effects on professional practice and health care outcomes (Review). *The Cochrane Database of Systematic Reviews*, 2001(Issue 1. Art. No.: CD003030), DOI: 10.1002/14651858.CD14003030.
- Tickle-Degnen, L., & Bedell, G. (2003). Heterarchy and Hierarchy: A Critical Appraisal of the "Levels of Evidence" as a tool for clinical decision making. *The American Journal of Occupational Therapy*, 57(2), 234-237.
- Trialists, O. S. (2003). Therapy-based rehabilitation services for stroke patients at home. *The Cochrane Database of Systematic Reviews*, 2003(Issue 1. Art. No:CD002925), DOI: 10.1002-1465188.CD1002925.
- van Kuijk, A. A., Geurts, A. C., Bevaart, B. J., & van Limbeek, J. (2002). Treatment of upper extremity spasticity in stroke patients by focal neuronal or neuromuscular blockade: a systematic review of the literature. *J Rehabil Med*, 34(2), 51-61.
- Ward, A. B. (2002). A summary of spasticity management--a treatment algorithm. *Eur J Neurol*, 9 Suppl 1, 48-52; dicussion 53-61.
- Waskiak, J., Hoare, B., & Wallen, M. (2004). Botulinum toxin A as an adjunct to treatment in the management of the upper limb in children with spastic cerebral palsy. *The Cochrane Database of Systematic Reviews*, 2004(Issue 4. Art. No.: CD003469.pub3), DOI: 10.1002/14651858.CD14003469.pub14651853.
- Watkins, C. L., Leathley, M. J., Gregson, J. M., Moore, A. P., Smith, T. L., & Sharma, A. K. (2002). Prevalence of spasticity post stroke. *Clin Rehabil*, 16(5), 515-522.