CLASSIFICATION SYSTEM FOR CEREBRAL PALSY WHEELCHAIR RUGBY PLAYERS

For the partial fulfillment of the degree

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DECLARATION

I declare that the research report hereby submitted as partial compliance with the requirements for the degree M.Sc.(Physiotherapy) in the Department Physiotherapy, Faculty of Health Sciences at the University of the Free State is my own independent work and has not previously been submitted by me to another university. I further cede copyright of this research report in favour of the University of the Free State.

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H. Malan

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ABSTRACT

CLASSIFICATION SYSTEM FOR CEREBRAL PALSY WHEELCHAIR RUGBY PLAYERS

Wheelchair rugby originated in 1977 in Canada, as a sport for athletes with tetraplegia (quadriplegia).The game has grown into an intense physical team sport for both female and male with a variety of disabilities involving all four limbs. Athletes are systematically grouped into sport classes according to their ability to move and perform basic functional skills in their specific sport. This allows for fairness. Cerebral palsy (CP) players joined the wheelchair rugby. Because the CP's disability lies on a total different level, classifiers find it difficult to classify them correctly.

The aim of the study as to explore whether the present classification system disadvantages the CP wheelchair rugby players.

An explorative descriptive research design was used. Data was gathered by the use of the nominal group technique. The research took place at the 2005 International Wheelchair Amputee Sport championships in Brazil. Seven specialists in the field of wheelchair rugby participated in the study.

The findings of the study and the conclusion reached indicated that there is a definite need for a different and more functional approach to bench testing cerebral palsy wheelchair rugby players. A new bench test format should be developed and could then be suggested to the International Wheelchair Rugby Federation for possible future inclusion in the classification manual.

ABSTRAK

KLASSIFIKASIE SISTEEM VIR SEREBRAAL GESTREMDE ROLSTOEL RUGBY SPELERS

Rolstoel rugby het 1977 in Kanada ontstaan as sport vir atlete met tetraplegie (kwadriplegie). Die spel het gegroeie tot ‘n intense fiesiese kompeterende spansport vir mans sowel as dames met ‘n ver7skeidenheid gestremdhede wat al vier ledemate affekteer. Spelers word in verskillende sportklasse vir spesifieke sportsoorte ingedeel om sodoende groter regverdigheid op die speelveld te bewerkstellig. Hierdie klassifikasie gekied volgens hul vermoë om te beweeg en basiese vaardighede van die spesifieke sport uit te voer. Serebraal gestremde spelers het later ook aan die sport begin deelneem. Aangesien hulle gestremdheid op ‘n totaal ander vlak lê, is dit moeilik vir die klassifiseerders om hierdie spelers korrek te klassifiseer.

Die doel van die studie was om vas te stel of die rolstoel rugby klassifikasie se bestaande sisteem die serebraal gestremde speler benadeel.

Die navorser het van ‘n verkennende beskrywende navorsingsontwerp gebruik gemaak. Data is deur middel van die nominalegroep tegniek ingesamel. Die navorsing het tydens die International Wheelchair Amputation Sport in Brasilië plaasgevind. Die deelnemers was sewe spesialiste op die gebied van rolstoel rugby klassifikasie.

Die resultate van hierdie studie het getoon dat daar ‘n defnitiewe behoefte bestaan vir ‘n meer funksionele benadering tot die spiersterktetoets (bench test) vir serebraal gestremde rolstoel rugby spelers. ‘n Nuwe formaat vir die spiersterktetoets moet ontwikkel word. Hierdie toets kan dan aan die International Wheelchair Rugby Federation se klassifikasiepaneel vir moontlike insluiting in die klassifikasiesisteem opgeneem te word.

OPERATIONAL DEFINITIONS

For the aim of this study the following definitions and abbreviations will be valid. The game of Wheelchair Rugby is explained and a summary of the researcher's experience in sport for the disabled is given.

Definitions

Action-motion test:	A test for coordination carried out at fast repetitions of sequences of movement. The test takes into account the coordinated and free mobility with spasticity and/or athetosis. It is used in classification systems when classifying swimmers and equestrian athletes. It is recorded on a scale of 1-5.
Bench test:	An objective physical muscle and movement test performed by a classifier to determine the score grade of a player.
Classification systems:	These are sport specific classification systems for the different disabilities.
Classifier:	Physiotherapists, occupational therapists and doctors with formal training in neuromuscular evaluation and muscle testing especially in spinal cord injured, poliomyelitis, and cerebral palsy as well as knowledge of other sport for the disabled.
Classifier Level 1:	A classifier who has classified disabled athletes at provincial level.

Classifier Level 2:	A classifier who has classified disabled athletes during two international tournaments for sport for the disabled under the supervision of International classifiers.
Classifier Level 3:	A level 2 classifier who has presented training workshops for new classifiers at international tournaments.
Classifier Level 4:	A level 3 classifier who is, as head classifier, responsible for the management and supervision of other classifiers at an international tournament.
Coach:	A person who develops a functional coaching philosophy, communicates with and motivate athletes; teach skills and develops a sound physical training program.
Field specialists:	Classifiers, coaches, trainers and officials with in-depth knowledge and experience of sport for people with disabilities in general and wheelchair rugby in particular.
Functional classification:	Classification based on the player's functional abilities specific to the physical demands of each unique sport code.
Functional profile:	The players are observed during play on court or performance of their specific sport activity. The player's classification is verified by comparing the

quality of skills displayed to a pre-determined formulated profile for each class.

Muscle testing: Muscle testing is an approach to the assessment of muscular strength of functional components of movement and performance. Classic muscle testing involves manual methods of evaluation and is recorded on the Oxford scale.

Point value: A point value is used to fit a player into a specific class. (Players with similar abilities are grouped together).

Referee: Each game is officiated by two referees. Referees of a given game should not be connected in any way with either of the organizations represented on the court and they should be thoroughly competent and impartial. The referees see to it that the game is conducted in accordance with the rules and procedures of the international rules of wheelchair rugby. The referee wears a uniform according to the IWRF rules.

Score grading system: Grades for manual muscle test are recorded as numerical scores ranging from zero to five. Each numerical score can be paired with a word that describes the performance in qualitative terms e.g. 0 = zero activity and 5 = normal.

Sport codes:	The different sport activities available for people with disabilities: Athletics, swimming, table tennis, wheelchair tennis, wheelchair basket ball, wheelchair dancing, wheelchair rugby, equestrian, archery, bowls, cycling, and cerebral palsy soccer.
Technical advisers:	People who interpret the rules of the game as it is played internationally. They maintain a record of certified international referees, provide assistance and leadership for the international development of the training of referees.

Abbreviations

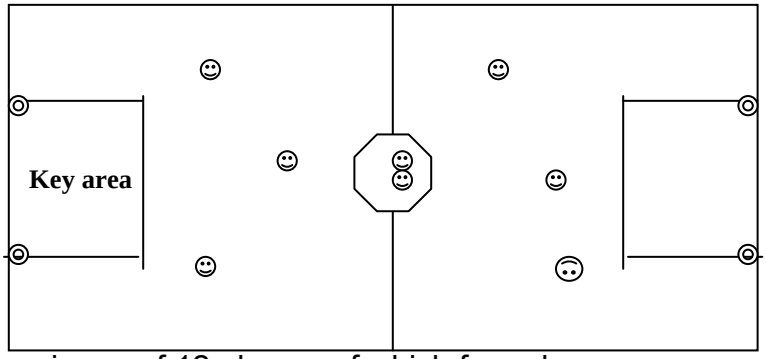
UE:	Upper extremity
CP-ISRA:	Cerebral Palsy International Sport & Recreation. Association
IWAS:	International Wheelchair & Amputee Sport Federation
IWBF:	International Wheelchair Basketball Federation
IWRF:	International Wheelchair Rugby Federation

The game of wheelchair rugby

Wheelchair rugby is a full contact sport and specially modified wheelchairs are used. The game is played on a standard basketball court with a volley ball. The court is divided into two halves. On either side of the court is a rectangle with two cones that is called the key area. Points are scored by driving through the two cones at the key area while in control of the ball.

(See figure 1)

Figure 1 Wheelchair rugby court



A team consists of a maximum of 12 players of which four players are on court at a time. Every player is classified before the game and gets a point value from 0.5 to 3.5 according to his abilities. The points of the four players on the court may not be more than eight in total at any time, but may be less. The players may be substituted during any time of the game.

A game consists of four quarters of eight minutes each with one minute break after the 1st and 3rd quarters. A 5-minute break is taken after the 2nd quarter. The time calculated for each quarter is done with start-stop, which means that every time the whistle blows the clock stops and starts again when play commences.

The game starts with a “shoot off” from the middle of the court. The aim of the game is to score as many goals as possible and a player in possession of the ball must be protected by teammates to enable him to score a goal. Obstruction of the person’s wheelchair is therefore allowed but no physical body contact of players is allowed. A player may hold the ball for only 10 seconds in which he then either has to bounce the ball or pass it to another player. After a goal is scored the ball is thrown in from behind the goals and when the ball goes out it is thrown in from the side at the place where the ball went out. When the ball is thrown in, the attacking team has 15 seconds to cross the halfway line after which they can take their time to score (Green, 1996:69).

RESEARCHER’S EXPERIENCE IN SPORT FOR THE DISABLED

The motivation for including the researcher’s experience in sport for the disabled is based on the fact that there is limited literature on the topic of a classification system for cerebral palsy wheelchair rugby players.

Since 1977 the researcher has been a national classifier for sport for disabled people in all the different sport codes in South Africa. During 1997 South Africa adopted wheelchair rugby as a team sport for quadriplegics and the researcher classified wheelchair rugby players as a Level 1 classifier. Up to date the researcher has attended two international tournaments. The first tournament was in Christchurch, New Zealand (2003) at the World Wheelchair Games and the second in Vancouver, Canada at The Canada Cup Tournament (2004). The researcher served as member of the International Wheelchair Rugby Classification Panel and qualified as a Level 2 international classifier.

To qualify as a Level 3 classifier a person must present training workshops for new classifiers at an international tournament. An expected possibility for the

researcher will be the international Oceanic Zone Championship in Johannesburg during 29th November - 3rd December 2005.

The researcher has attended numerous courses on the neurological developmental therapy approach of evaluating, understanding and handling cerebral palsy victims and has 15 years experience as a physiotherapist at a school for cerebral palsy children.

For the last 13 years the researcher was a lecturer at the Department of Physiotherapy, University of the Free State and subject specialist in adult neurology and spinal cord injured rehabilitation.

Through the years the researcher had extensive experience in sport for the disabled being a referee, coach, manager, and classifier in the following sporting codes: swimming, table tennis, athletics, wheelchair basket ball, wheelchair rugby, archery and cycling.

CHAPTER 1

Classification system for cerebral palsy wheelchair rugby players

1.1 INTRODUCTION

People with disabilities are an integral part of society as a whole, and should have opportunities to develop talents and capabilities to national and international levels.

Unfortunately negative attitudes are continually reinforced on them by society. Disability is portrayed as a “problem” or people with disabilities are seen as tragic victims. They are often perceived as dependant, ill and in constant need of personal care and medical treatment (ICIDH, 1999).

The attitude of society towards people with disabilities has been very negative until the end of World War II, which left thousands of people disabled. The impact of this tragedy changed people’s attitudes towards disability as such. More support were generated and offered to the disabled population. In July 1948 the Stoke Mandeville Games for Paraplegics was founded in the United Kingdom as an annual sports festival. The Games have continued to develop and are now part of the Olympic Games as the Paralympic Games. (Sport and the Disabled, 2004:2).

Since 1948 people with disabilities mobilized themselves and acted pro-actively by forming organizations that have mushroomed since 1984, to enable people with disabilities to reach and maintain their optimal physical, sensory, intellectual and psychological functioning levels. The aim of these organizations was to

provide people with disabilities with tools to change their lives and to give them greater choices in partaking in sport and recreation activities (GOVZA, 2001:1).

Sport has an immense therapeutic value and plays a great part in the physical, psychological and social rehabilitation of people with disabilities. In comparison to able bodies, the severity of a person's handicap determines their participation and training in sport. With new technology available most sport codes can be adapted for people with disabilities and rules may be modified to accommodate the nature of a specific disability (Sport and the Disabled: 2004).

People with physical disabilities can take part in numerous sport activities, on a competitive as well as on a recreational level such as athletics, swimming, table-tennis, wheelchair rugby, bowls, skiing, tennis, wheelchair dancing, equestrian and a multitude of other sport codes. The different sport codes offered to people with a disability are just as exciting and challenging as able body sport. For a person with a disability to compete in any sport for the disabled he/she must be classified for the specific sport code (Sport and the Disabled, 2004).

This classification system is a unique and integral part of sport for persons with disabilities. The purpose of the classification systems is to ensure fair and equitable competition at all levels of sport. This allows athletes to compete at the highest level regardless of individual differences in physical function (Bulger-Tsapog & Glen, 2003).

Classification systems have been in use in sport for the disabled since the 1940's. The early classification systems were based on medical diagnoses only and were not specific for the unique functional demands of each sport. The transition from "medical classification" to "sport-specific classification system" resulted in the "functional classification systems". The class profiles of this system are based on an athlete's functional ability specific to the physical

demands of each unique sport e.g. wheelchair basketball, table tennis and wheelchair rugby (Sport and the Disabled, 2004).

Each sporting code has its own specific classification manual as a guide to classifiers who classify participants for each sporting code. The object of a classification system is to group together those athletes of approximate equal potential (Bulger-Tsapog & Glen, 2003).

The game of wheelchair rugby began in Winnipeg, Manitoba in the 1970's by a person suffering from a cervical spine injury (quadriplegic). He was a sports person who played wheelchair basketball but lacked the functional ability to play at international level. Basketball is a team sport for players with normal arm strength and functionality. As a counterpart to wheelchair basketball Duncan Cambell and his friend, a professor of architecture at the Manitoba University, developed the game of wheelchair rugby for persons with tetraplegia, quadriplegias or equivalent functional deficits. The root of the game wheelchair rugby stems from wheelchair basketball and ice hockey. This new game was previously called "murder ball' and at present is known as wheelchair rugby. This game is at present the fastest growing paralympic team sport for the disabled (IWRF, 2005).

Only players with a disability in all four limbs, cervical spinal injured (quadriplegics), multiple amputations, anomalies, poliomyelitis and cerebral palsy victims are eligible to play wheelchair rugby. Because of the unique and varied nature of their muscle function wheelchair rugby players demonstrate combinations of varying trunk, upper and lower extremity movement in performing the wheelchair rugby skills.

To determine an athlete's skills it has to be classified by a panel of classifiers observing a player as he performs a variety of these skills.

Firstly classifiers perform the **bench test** (Appendix E) where the athlete's limbs are tested for strength, flexibility, sensation and muscle tone as well as the player's trunk for balance, the ability to bend**,** rise and to rotate to both sides. The existing IWRF classification system tests muscle strength of the player according to the Oxford scale 1–5. A **point value** is given to the player according to the IWRF classification definition of upper extremity point values (IWRF, 2005.) (Appendix B).

In the game of wheelchair rugby the total score of the point values tested on the bench test may not be more than 8 points amongst the 4 players playing on court. Each point value of a player determines the specific role he has to play in the team e.g. 0.5 will be a blocker and defender and a 3.0 will be a runner and ball carrier or offender (IWRF, 2005).

In addition to the bench test the player's execution of ball and wheelchair skills are observed on court during actual game play to verify and validate the players class according to the IWRF **functional profiles** (IWRF, 2005). (Appendix C)

1.2 FORMULATION OF THE PROBLEM

Through discussions with coaches and experts training cerebral palsy wheelchair rugby players and the researcher's observations and experience with cerebral palsy sport people. The researcher feels there is a need to investigate the need for a different approach to the classification bench test format, than the existing bench test format.

At present during the classification process a cerebral palsy wheelchair rugby player would portray a high upper extremity **point value** on the **bench test** but does not meet the criteria of the **functional profile** during play. Because cerebral palsy players have good shoulder hand and finger movement strength. But due to the complex profile of cerebral palsy their functional skills can not be rated as normal. Thus their performance on court does not meet the functional profile

criteria of the IWRF classification system. The implication of this is that the cerebral palsy wheelchair rugby player's quality of play does not fulfill the specific role in the team. This is detrimental to the game of wheelchair rugby as it affects the composition, planning and training of the teams.

The existing IWRF classification system tests the individual muscle strengths of the athlete according to the Oxford scale, the present bench test.

The use of manual muscle testing is valid in normal persons and those with weakness or paralysis secondary to motor unit disorders such as lower motor neuron lesions and muscle disorders. The use of manual muscle testing in persons with disturbances of the higher neural centers (cerebral palsy) is flawed because of interference by abnormal sensation of disturbed tone and motor control (Daniels & Worthingham, 1980*).*

Normally the balance is perfect between muscles because of the complexity and precision of the underlying systems that allow us voluntarily to conceive and execute a highly complex task, smoothly and in a coordinated manner, all without conscious thought. The sole purpose of muscles is to generate force. The extent to which the force is generated and released is again controlled by the centers in the brain (Finny, 1997:Introduction).

All persons with cerebral palsy have a difficulty in moving purposefully and efficiently, and have difficulty in timing and grading of movement regarding gross motor skills and fine hand motor skills. No two people experience exactly the same difficulties. The movement may be poorly coordinated and therefore abnormally executed. The abnormal patterns of posture and movement affect all aspects of normal movement and prevent functioning effectively. Muscles work in patterns, and the brain responds to this intention by making groups of muscles, and not single muscles, work (Finny, 1997:Introduction).

During an assessment of a cerebral palsy player the classifier observes the way he moves spontaneously, the level of the skilled, purposeful, effective functional movement patterns when he interacts with the environment. Nevertheless muscle function must be assessed in such people although the procedures used may be quite different. Additional tests for these people remain to be codified, and other procedures, which probably will require the use of extensive technology, may be available for routine clinical use at a future clinical use at a future time (Finnie:1997:4).

As the cerebral palsied player does not have muscle weakness or paralysis of a specific muscle he will, therefore, test high on the bench test. This score, however, does not reflect the true ability of the cerebral palsy player and the classification system does not give an accurate picture of the player's functional skills and abilities. To concur with test reliability the classification system in use for cerebral palsy wheelchair player proves to be unreliable.

Cerebral palsy swimmers and equestrian athletes are classified using the active-motion test which tests a combination of specific movements for that sport code. A more realistic and reliable point value would be obtained if the bench test in the classification of cerebral palsy wheelchair rugby players could be modified by using the action-motion test instead of the muscle strength test.

1.3 AIM OF STUDY

The primary aim of this study is to research the possible disadvantages of the existing IWRF classification system as used for classifying cerebral palsy wheelchair rugby players.

The secondary aim is the recommendation of a new classification system that will consist of a series of functional movement patterns that tests the coordinated smooth reciprocal patterns of functional movements a player should execute to

be classified on the point scale equal to the existing IWRF classification system.(Appendix A).

The researcher will use the same basic approach, with the same criteria, as the swimming classification system is based on.

1.4 RESEARCH METHODOLOGY

1.4.1 Study design

The nominal group technique (NGT) will be used as an evaluation tool to determine the disadvantages of the current IWRF classification system bench test classifying cerebral palsy players.

The technique combines qualitative and quantitative components in a structured interaction, which minimizes the influence of the researcher, and of group dynamics. It combines qualitative and quantitative components in a structured interaction, which minimizes the influence of the researcher, and of group dynamics (Chapple & Murphy: 1999:147-159).

The NGT identifies relevant outcomes both expected and unexpected and the participants' perspective is now legitimately accepted to form part of the evaluative exercise. Group consensus can be reached faster and everyone has equal opportunity to present ideas (Chapple & Murphy, 1999:147-159).

An adapted version of the NGT was used to determine the disadvantages of the current IWRF classification system bench test in classifying cerebral palsy players.

Research in group dynamics indicates that more ideas are expressed by individuals working in a group environment than by individuals engaged in a

formal group discussion. Group consensus can be reached faster and everyone has an equal opportunity to present ideas (Lloyed-Jones, Fowell & Bligh, 1999:11).

1.4.2 Pilot study

A pilot study is a smaller version of the proposed study in preparation for the major study. The participants in a pilot study may not form part of the eventual population group in the final research study (Burns & Grove, 2001:49). As the study population is small and unique, it was not possible to perform a pilot study on a similar population in South Africa as a group of expertise with the level and quality of experience than that of the research population is not available.

The game of wheel chair rugby was only introduced in 1999 in South Africa and therefore is a relatively new team sport. Another factor is that the coaches and classifiers involved in wheelchair rugby in South Africa have not had the opportunities and exposure as international counterparts.

1.4.3 Research question during the NGT

According to the Virginia Institute of Government (Undated: Online) these question(s) should be carefully structured and based on the purpose of the study, as the nature and quality of the response is determined as much by the nature of the question as by the NGT itself. Creswell (1998:99) recommends the use of a single, overarching question and several subquestions. The proposed central question posed read as follows:

> ***"Does the existing IWR classification system disadvantage cerebral palsy rugby players?"***

The NGT was conducted in English. The facilitator, a Physiotherapy lecturer at the University of Arizona, is a person with sound knowledge of the NGT. Although it is good practice to record the interview (Durham,1998: online) it was not possible for the researcher to be so and she assisted the facilitator by observing the participants' reactions/and taking field notes.

The participants were welcomed, the purpose of the study explained and the consent form completed (Creswell, 1998: 125). Hereafter, the NGT process was discussed and the participants encouraged to partake freely as individual contributions were of utmost importance (Durham, 1998: Online).

1.4.4 Study population

The study population, as a group of expertise, consisted of coaches, referees, classifiers and technical advisers training cerebral palsy wheelchair rugby players. Although it was impossible to get the group of expertise assembled an ideal opportunity presented itself at the IWAS world championships in Brazil during September 2005. At the championship it was possible to include international coaches, referees, classifiers, and technical advisers in the study. The seven available persons were asked to partake in the research.

1.4.5 Data collection

A NGT session was held with the seven international specialists in wheelchair rugby. They met as a structured group to gather information about specific concerns - that is to identify the disadvantages of the existing IWRF classification system concerning cerebral palsy wheelchair rugby players.
A suitable venue should be large enough to seat the participants comfortably, yet small enough to create an atmosphere of security. The participants should be able to work in silence, free from environmental distraction The seating should be

arranged in an open “U” with the flip chart at the open end of the table and a flip board available (Cresswell 1998: 124). This was due to the unique circumstances not possible and the researcher had to deviate in order to complete the research. Paper for the jotting of ideas and an informed consent were given to the participants (Dunham, 1998: Online).

The NGT was conducted in English. The facilitator, a physiotherapy lecturer at the University of Arizona, is a person with sound knowledge of the NGT. Although it is good practice to record the interview (Dunham, 1998: Online) it was not possible for the researcher to do so and she assisted the facilitator by observing the participants’ reactions and/or taking field notes.

The following four steps of the NGT were applied:

Step 1 Silent generation of ideas in writing (10 minutes)

The researcher welcomed and thanked everybody for being willing and available to participate in the study. She gave some background information and an overview of the technique. She mentioned it that the whole process had to be completed in the one hour and that they will be able to return to their duties in time.

After the central question had been asked the participants were requested to take five minutes to silently generate their experiences in writing by jotting their response to the question on the paper in brief phrases (Dunham, 1998:Online). During this phase the participants considered as many responses to the question privately and silently write it down. Interaction was discouraged to prevent individuals dominating the process (Dunham, 1998:Online).

Step 2 Round-Robin recording of ideas (20 - 30 minutes)

Each group member in turn presented, but not discuss, one of the ideas on his/her list. The ideas created in the silent phase were recorded on a self made flip file in numerical order. The procedure was continued “around the table” until all ideas were recorded. Participants were requested not to duplicate ideas by repeating an item already listed, but to proceed to the following item on their list. There were no discussions and participants were permitted to “pass” if they did not have new experiences to share. They could re-enter later, if they wished to (Dunham, 1998:Online).

Step 3 Discussion and grouping of ideas (10 minutes)

The facilitator read each numbered idea on the flip file and ensured that meanings were clear, and if any questions, interpretation, or explanations needed. The facilitator started at the top, reading it out loud and the group discussed each idea. The ideas were grouped into five main ideas to facilitate the voting process as limited time was available. The five group ideas were written down in a different colour.

Step 4 Voting on priorities: silent, independent (5 minutes)

The purpose of this step is to aggregate the judgments of the individual participants to determine the relative importance of each individual idea (Durham 1998 online). The facilitator asked each participant to prioritize the five ideas by rating the ideas least important naught (0) and the top priority five (5). The participants were asked to transfer the number of the grouped ideas to their page, and next to the number the rating of that idea. The votes were handed to the facilitator.

The papers with the ratings on were handed in and read out loud. The facilitator wrote each rating on the flip file next to the number of the one to five (1-5) main ideas.

The total score for each item was calculated. The voting results were listed on the flip chart to provide a permanent record of the group's agreement.

1.5 TRUSTWORTHINESS

The worth of any research endeavours need to be evaluated. Qualitative research, differing from quantitative research in nature and purpose, requires a unique set of assessment criteria (Krefting, 1991:214).

Guba's model for assessing the trustworthiness of qualitative data has been successfully applied for many years, according to Krefting (1991:215), and was consequently employed in this study. Four aspects of trustworthiness were identified that are relevant to both quantitative and qualitative studies, namely

- truth value (credibility);
- applicability (transferability);
- consistency (dependability) and
- neutrality (confirmability).

These strategies that were implemented to ensure trustworthiness will be fully discussed in Chapter 2.

1.6 ETHICAL ISSUES

Participation in the study was voluntary and participants were granted the right to withdraw from the study at any time. The participants were informed of the purpose and procedures of the study and each participant was requested to

complete a consent form (Appendix D) in which confidentiality was assured (Cresswell, 1998:115).

Permission to conduct the study was obtained through:

- Submission of the research protocol to the research committee of the Department of Physiotherapy of the University of the Free State;
- Submission of the research protocol to the research committee of the School of Allied Health Sciences, University of the Free State;
- Submission of the research protocol to the ethical committee of the Faculty of Health Sciences, University of the Free State (ETOVS NR 164/05).

Planning and compiling of the research project was done honestly and with integrity.

1.7 DATA ANALYSIS

Data collection and analysis take place simultaneously during the process of the NGT. The processes suggested by Cresswell (1998:140, 141) were used. (Please refer to 1.4.5) Experiences were rank-ordered by the participants, thus providing a more reliable version of the "essence" of the experiences. The results are claimed to represent the consensus view of the group.

From the analysis of the results and outcome of the NGT session the need for a more specific bench test format for cerebral palsy wheelchair rugby players was established.

1.8 VALUE OF THE STUDY

Data gathered concerning the possible disadvantage of the existing classification of cerebral palsy wheelchair players could increase the understanding for the

possible need of a more appropriate classification system. From analysis of the data the researcher will be able to formulate the problems of the existing IWRF classification.

Findings of this study may therefore have a far-reaching effect on cerebral palsy wheelchair rugby. The CP wheelchair rugby players will be able to play and enjoy the game of wheelchair rugby during training and game planning. They would feel more secure in their role in the team as their classification will be more realistic and they will fit their functional profiles better.

1.9 CONCLUSION

In this chapter, the introduction and problem statement were discussed. The literature and background will be discussed in full in the next chapter.

CHAPTER 2
Literature study and background

==========

2.1 INTRODUCTION

People with disabilities experience the same need for sport, including competitive sport, and recreation. Sport is generally regarded as one of the vital components in the integration of people with disabilities into society as vital component in the successful rehabilitation of people with disabilities. (GOVZA, 2001:Foreword).

The aims of sport encompass the same principles for disabled people as they do all the able-bodies. Sport has an immense therapeutic value and plays a great part in the physical, psychological and social rehabilitation of people with disabilities. In comparison to able bodies, the severity of a person's handicap determines their participation and training in sport. With new technology available most sport codes can be adapted for people with disabilities and rules may be modified to accommodate the nature of a specific disability (Sport and the Disabled: 2004).

1.2 PSYCHOLOGY IN SPORT FOR THE DISABLED

Sport psychology has a rich history dating back to the early 1900's in the Soviet Union. The field was used to develop elite athletes and train future coaches. Today sport psychology is growing and becoming more widely accepted and used through out the world. The value of sport psychology is not limited to a certain level of athlete. Although early work were mainly conducted on elite performers more recently attention has been paid to children, senior's average athletes, and athletes with disabilities.

The researcher sums up previous findings in her discussion of considerations for working with athletes with disabilities. She generally mentions that it is imperative that the sport psychologist works with the athlete and not the disability. This can be increased by talking openly and honestly about the disability and moving on to the more relevant issue of performance enhancement. Just like all people and all athletes, these individuals need to be allowed to fail. Failure and success are part of sport and they need to be experienced by all athletes (Weinberg & Gould:1999)

Not all athletes with disabilities report anxiety in the same way that able-bodied athletes report anxiety. In many cases, athletes with physical disabilities, such as those with amputations or spinal cord injury, have experienced previous life trauma – they have had to deal with the loss of a limb or the loss of the use of their limbs. In the process of having to cope with such dramatic life changes, it is likely that these individuals developed effective coping mechanisms. This may be why some athletes with disability do not report experiencing the same type of anxiety as do able-bodied athletes. They may know how to deal with anxiety better than athletes who have not had the same types of life experience (Bonnar, 1997:Online)

2.3 ORGANIZATIONAL STRUCTURE OF SPORT FOR THE DISABLED IN SOUTH AFRICA

People with physical disabilities can take part in numerous sport activities at competitively as well as recreational level depending on their disability. The following sport codes offered to physical disabled people are just as exiting and challenging as able body sport. The sport codes are run by organizations whose only objectives is to promote, manage, administer and co-ordinate the competitive and recreational participation in sport activities by disabled persons in the Republic of South Africa.

2.3.1 Sporting codes supported in South Africa

The following are the sport codes supported in South Africa:

- Archery
- Athletics
- Bowls
- Boccia
- Cycling
- CP soccer
- Equestrian
- Goal ball
- Power lifting
- Shooting
- Swimming
- Table tennis
- Wheelchair basketball
- Wheelchair tennis
- Wheelchair rugby
- Wheelchair/dancing

  (DISSA, 2003:Online)

2.3.2 Disability sport organizations

The following are the international sport organizations involved in sport activities of disabled persons in the Republic of South Africa:

Cerebral Palsy International Sport & Recreation Association (CP-ISRA)
International Blind Sport Association (IBSA)
International Federation of Sports for Persons with Intellectual Impairment (IINSA)
International Stoke Mandeville Wheelchair Sports Federation (ISMWSF)

International Sports Organization for the Disabled (amputees) (ISOD)
International Wheelchair & Amputee Sport Federation (IWASA)
(DISSA, 2003:Online)

2.4 HISTORY OF SPORT FOR THE DISABLED

In July 1948 the Stoke Mandeville Games was founded as an annual sports Festival for the paralyzed. The Games took place on the same day as the Olympic Games in London showing the public that sport was not the privilege of the able-bodied alone. The games have continued to develop for all disabled people and every four years held in the same country as the Olympic Games.

In 1967 Jim Winthers brought together a small group of Vietnam veterans to support each other as they learned to cope with their disabilities. These veterans taught themselves and others how to ski. Winthers, a World War II Veteran of the 10th Mountain Division and Director of the Soda Spring Ski School, helped form the now called organization Disabled Sport USA, Far West It was then called the National Amputee Skiers Association (NASA). In 1976 it was no longer solely serving skiers and changed to National Handicapped Sports and Recreation Association and in 1994 became Disabled Sport USA. The goals of Disabled Sport USA were:

- To facilitate physical and psychological rehabilitation, through education, recreation and sports;
- To assist in the development of a positive self-image, and in achieving attitudes;
- To increase public awareness of the capabilities of people with disabilities;
- To serve as a source of information, about sports and recreation opportunities;
- To encourage people, with disabilities, to be involved in the management and other aspects of sport and programs;

- To teach good sportsmanship, encourage competitive spirit and foster independence through program activities.

The organization continued its rehabilitation orientation and remains dedicated to believe that sport are a vital part of the process in which disabled individuals gain self-confidence, mobility, and greater independence. (Sport and the Disabled, 2001).

2.5 EARLY DILEMMA IN SPORT FOR THE DISABLED

Disability- specific classification systems were used at the 1988 Paralympic Games in Seoul, Korea. There were 7 classes for wheelchair users, 8 classes for athletes with cerebral palsy, 9 classes for athletes with amputations, 9 classes for les autres athletes and 3 classes for blind athletes bringing it to a total of 36 classifications. Thus in a race such as 50m dash in track, a total of 72 races were scheduled, one for each class in each gender. A similar escalation of the number of events occurred in other sports.

The large number of races was a problem for athletes as some competed in events with very little competition as only a few athletes competed and some waited hours to compete. Some did not even compete as races were cancelled a month before the Games because not enough entries, minimum of 6 according to the International Paralympic Committee (IPC) rules to conduct an event, were made. Imagine being in a position of having your item cancelled after months or years of training and having raising funds to travel to the Games. It was all a logistical nightmare to conduct a quality games with so many events.

To solve the problem the IPC demanded that each sports committee develop a sport specific classification system that significantly decreased the number of classes. All competitors are classified depending on the sporting code they wish to participate in irrespective of their diagnosis. All events require a bench

test and confirmation by observation in competition by medical classifiers and technical classifiers.

The new system was implemented at the 1992 Barcelona Paralympic Games (Disability Sport, 2001)

2.6 CLASSIFICATION

2.6.1 Introduction

The classification system is a unique and integral part of sport for persons with disabilities. The purpose of the classification systems is to ensure fair and equitable competition at all levels of sport. This allows athletes to compete at the highest level regardless of individual differences in physical function. Each sporting code has its own specific classification manual as a guide to classifiers who classify participants for each sporting code. The object of a classification system is to group together those athletes of approximate equal potential (Bulger-Tsapog & Glen, 2003)

The object of a classification system is to group together those athletes who have a movement potential that is approximately equal. Movement potential is defined as the potential to contract muscles which will then cause active movements of the limbs and trunk (ISMWSF, 2001)

2.6.2 Definitions

The use of the word **"classification system**" indicates that there is a difference between individuals that is not acceptable or fair for competition purposes, in a single competition.

The use of the words **"approximately equal**" indicates that whilst there may be individual differences, those in any single class have an acceptable or fair chance within that competition. This is described as the "Range within the Class".

The use of the words **"movement potential**" is deliberate and different from the term "functional". The grouping of athletes by movement potential means that they each have an equal chance to make movement and specifically exclude factors such as:

1. Genetic superiority or inferiority.
2. Body size or type i.e. height, strength, length of arms and so forth.
3. Event techniques, i.e. the actual action used to push a wheelchair or throw an implement where the chosen technique is due to 1 or 2.
4. Event techniques (actual action), where poor techniques is the result of lack of knowledge or bad coaching.
5. The use of strapping which provides stability and allows enhanced techniques, the seating position in track or tying the body to the throwing chair.
6. Poor equipment that may be for the same reason as in 4 or due to lack of finance.

   (ISMWSF, 2001)

2.6.3 Classification systems

Classification systems have been in use in sport for the disabled since the 1940's. The early classification systems were based on medical diagnoses only and were not specific for the unique functional demands of each sport. The transition from "medical classification" to "sport-specific classification system" resulted in the "functional classification systems". The class profiles of this system are based on an athlete's functional ability specific to the physical demands of each unique sport example wheelchair basketball, table tennis and wheelchair rugby (Buckley, 2002:Online).

Functional classification systems ensure that athletes with a combination of impaired, or absent, upper and lower limb movement have an opportunity to play the sport and that the strategies and skills of competing teams and athletes, rather than the amount of movement of the athletes, are the factors determining success in competition.

Without classification the sport would not exist. The term **"functional classification**" involves a medical test to firstly establish that the athlete meets minimal disability or criteria for that sport (i.e. they are disabled enough), then observation of the athlete performing the sport. Classification is often filled with controversy as someone will always feel that their disability is just a little more unique than others. Able-bodied athletes do not have different categories based on height, arm span or race which can be seen as a distinct advantage.

Classification does exist in some able-bodied sports, e.g. weight categories in weightlifting, boxing etc. A "perfect" classification system will never be created, as there will be a range of disability within each class. No two athletes either able bodied or disabled are exactly alike. Two disability groups use only a "medically" based test to establish eligibility to compete. The visually disabled (blind) are classified by an eyesight test - the athlete has to be legally blind and there are 3 categories. The intellectually disabled have one category only – it does take into consideration any additional physical disability (Buckley, 2002:Online)

2.6.4 CLASSIFICATION OF WHEELCHAIR RUGBY PLAYERS

Please refer to Appendix A.

2.7 WHEELCHAIR RUGBY

2.7.1 History of wheelchair rugby

With roots in wheelchair basketball and ice hockey, wheelchair rugby began in Winnipeg Manitoba Canada in 1977 by a group of quadriplegic athletes who were looking for an alternative to Wheelchair Basketball. They wanted a sport which would allow players with reduced arm and hand function to participate equally. In 1981 the first US team was formed and in 1988 the US Quad Rugby Association was founded. The first international tournament with teams from outside North America was held in 1989 in Toronto, Canada. With teams from Canada, USA and Great Britain, this was a breakthrough for developing international competition and co-operation. Wheelchair rugby first appeared at the World Wheelchair Games in 1990 as an exhibition event. In 1993 with 15 countries actively participating, the sport was recognized as an official international sport for athletes with disability and the International Wheelchair Rugby Federation (IWRF) was established as a sport section of the International Sport Mandeville Wheelchair Sport Federation (ISMWSF).

In 1996, wheelchair rugby was officially recognized by the Atlanta Paralympic Games as a demonstration sport and as a full medal sport at the 2000 Sydney Paralympics Games.

2.7.2 Eligibility criteria to play wheelchair rugby

Athletes must meet minimal eligibility criteria to play the sport of wheelchair rugby. Competitors with non-neurological conditions may be eligible to play wheelchair rugby if they demonstrate functional limitations in the trunk and in all four extremities and they are deemed eligible following the classification tests.

2.7.3 Classification in wheelchair rugby

The first classification system was medically based and there were three classes, largely determined by medical diagnosis and level of spinal cord injury. In 1991 the system was changed to a functional classification system unique to the sport of wheelchair rugby. This was done for reasons, including the need to have a system that would accommodate the growing number of athletes both with and without spinal cord injury such as poliomyelitis, cerebral palsy, muscular dystrophy, multiple sclerosis and quadruple amputations (IWRF Manual, 2005)

Due to the unique and varied nature of their muscles function wheelchair rugby athletes demonstrate combinations of varying trunk, upper and lower extremity movement in performing the wheelchair rugby skills of ball handling, i.e. passing, catching, carrying, and dribbling as well as wheelchair skills which include pushing, starting, stopping, directional change, tackling, and blocking.

To determine an athlete's skills it has to be classified by a panel of classifiers observing a player as he performs a variety of these skills. (Appendix C)

Firstly classifiers perform the **bench test** where the athlete's limbs are tested for strength, flexibility, sensation and muscle tone as well as the player's trunk for balance, the ability to bend**,** rise and to rotate to both sides. The existing IWRF classification system tests muscle strength of the player according to the Oxford scale 1–5. A **point value** is given to the player according to the IWRF classification definition of upper extremity point values (IWRF Manual, 2005). (Appendix B)

In the game of wheelchair rugby the total score of the point values tested on the bench test may not be more than 8 points amongst the 4 players playing on court. Each point value of a player determines the specific role he has to

play in the team e.g. 0.5 will be a blocker and defender and a 3.0 will be a runner and ball carrier or offender.

In addition to the bench test the player's execution of ball and wheelchair skills are observed on court during actual game play to verify and validate the players class according to the IWRF **functional profiles** (IWRF Manual, 2005) (Appendix C)

Athletes with neurological conditions may be eligible to play wheelchair rugby if they demonstrate functional limitations in both the trunk and three or four extremities and they are deemed eligible following the classification tests.

2.7.4 Game of wheelchair rugby

(Please refer to the definitions on page vi)

Two teams of four players each play wheelchair rugby. All players must be in wheelchairs and be classed according to the present classification system. The purpose of each team is to have a player score by touching or crossing the opponent's goal line while maintaining possession of the ball. The ball may be passed, thrown, batted, rolled, dribbled, or carried in any direction subject to the restrictions laid down in the rules. The team scoring the most goals by the end of the game is declared the winner.

Wheelchair rugby is a full contact sport and specially modified wheelchairs are used. The game is played on a standard basketball court with a volley ball is used. The court is divided into two halves. On either side of the court there is a rectangle with two cones that is called the key area. Points are scored by driving through the two cones at the key area while in control of the ball. (Please refer to figure 1 on page vi)

A team consists of a maximum of 12 players of which four players are on court at a time. Every player is classified before the game and gets a point value from 0.5 to 3.5 according to his abilities. The points of the four players on the court may not be more than eight in total at any time, but may be less. The players may be substituted during any time of the game.

A game consists of four quarters of eight minutes each with one minute break after the 1st and 3rd quarters. A five minute break is taken after the 2nd quarter. The time calculated for each quarter is done with start-stop, which means that every time the whistle blows the clock stops and starts again when play commences.

The game starts with a "shoot off" from the middle of the court. The aim of the game is to score as many goals as possible and a player in possession of the ball must be protected by team mates to enable him to score a goal. Obstruction of the person's wheelchair is therefore allowed but no physical body contact of players is allowed. A player may hold the ball for only 10 seconds in which he then either has to bounce the ball or pass it to another player. After a goal is scored the ball is thrown in from behind the goals and when the ball goes out, it is thrown in from the side at the place where the ball went out. When the ball is thrown in, the attacking team has 15 seconds to cross the halfway line after which they can take their time to score. (IWRF Wheelchair Rugby Rules, 2004).

2.7.5 PLAYERS' RESPONSIBILITY

It is the responsibility of both players and coaches to be educated about the classification process and proper procedure. Athletes are responsible for arriving at the classification area at their assigned times and in their playing chairs with gloves, straps and any other equipment that they use during play. Equally as important, the athlete must give full effort and co-operation. Any

athlete perceived as not fully co-operating with the classification process may sustain penalties such as:

- May not be given a classification, thus be ineligible to play;
- May be disqualified from a tournament, thus be ineligible to play;
- May have their class changed at any time;
- May not be awarded an international class.

In the event that an athlete enters the classification area under the influence of any performance altering substance, the athlete will be asked to leave without receiving a classification and therefore will be ineligible to play.
(IWRF Manual, 2005).

2.8 THE CLASSIFIER IN WHEELCHAIR RUGBY

The eligibility for classifiers is as follow:

- The classifiers are individuals mainly, physiotherapists occupational therapists and doctors with formal training in neuromuscular evaluation and testing;
- The classifier must have experience in the evaluation of the physically disabled individuals, especially those most common in wheelchair rugby, i.e. SCI (spinal cord injured), poliomyelitis and CP (cerebral palsied);
- The classifier must have knowledge of wheelchair rugby/sports and/or willingness to increase their knowledge through watching sport;
- The classifier must demonstrate competence in manual muscle testing of the upper and lower extremities and trunk.
  (IWRF Manual, 2005)

2.8.1 Levels of classifiers

Please refer to the definitions of classifiers on page iii.

2.9 Manual muscle testing

2.9.1 Introduction

Manual muscle testing (MMT) is an approach to the assessment of muscular strength and functional components of movement and performance. Classic muscle testing involves manual methods of evaluation.

Among the earliest clinicians to organize muscle testing and support such testing with sound and documented kinesiology procedures in the way they are used today were Henry and Florence Kendell. With earliest published documentation on comprehensive manual muscle testing 1936. The first comprehensive text on muscle testing was written by Daniels, Masters, Williams and Worthingham and published in 1946. This book is still in print.

Use of manual muscle testing is valid in normal persons and those with weakness or paralysis secondary to motor unit disorders (lower motor neuron lesions and muscle disorders). The use of manual muscle testing in persons with disturbances of the higher neural centers (CP) is flawed because of interference by abnormal sensation, of disturbed tone or motor control. Nevertheless muscle function must be assessed in such patients, although the procedures used may be quite different. Additional tests for these people remain to be codified, and other procedures, which probably will require the use of extensive technology, may be available for routine clinical use at a future time (Daniels & Worthingham, 2002:xix).

Criteria given on a muscle test comprises both subjective and objective factors. Subjective factors include the examiner's impression of the amount of resistance to give before the actual test and then the amount of resistance the person actual actually tolerates during the test. Objective factors include the ability of the person to complete a full range of motion or to hold the position once placed there, and to move the part against gravity or an inability to move it at all. All these factors require clinical judgment, which makes manual testing an exquisite skill that requires considerable experience to master (Daniels & Worthingham, 2002:xix).

2.9.2 Factors influencing manual muscle testing results

The following factors may influence the MMT results:

- The intrusion of a living, breathing, feeling person into the neat test package may distort scoring for the unwary examiner. The following circumstances should be recognized. There may be variation in the assessment of the true effort expended by a person in a given test e.g., reflecting the patient's desire to do well or to seem more impaired than is actually the case.
- The player's willingness to endure discomfort or pain may vary e.g. in the stoic, the whiner and the high competitor.
- The player's ability to understand the test requirements may be limited in some cases because of comprehension and language barriers.
- The motor skills for the test may be beyond some player's ability e.g. the clumsy cerebral palsy or inept person who just cannot perform as required.
- Lassitude and depression may cause the player to be indifferent to the test and the examiner.

- Cultural, social and gender issues may be associated with palpation and exposure of a body part for testing.
  (Daniels & Worthingham, 2002).

2.9.3 Preparation for the manual muscle test

Certain preparation has to be done before executing the MMT:

- The classifier and the player must work in harmony if the test session to be successful. This means that some basic principle and inviolable procedures should be second nature to the classifier. The player should be as free as possible from discomfort or pain for the duration of each test. It may be necessary to allow some people to move or be positioned between tests.
- The environment for testing should be quiet and no distraction. The temperature should be comfortable for the partially disrobed subject.
- The plinth or mat table must be firm to help stabilize the part being tested.
- Player position should be carefully organized so that position changes in a test sequence are minimized and position must permit adequate stabilization of the part or parts being tested by virtue of body weight or with help provided by the classifier.
- All materials needed for the test must be at hand. This is particular important when the player is anxious for any reason or is too weak to be safely left unattended.
  (Daniels & Worthingham, 2002)

2.10 VALIDITY OF THE EXISTING WHEELCHAIR RUGBY FEDERATION CLASSIFICATION SYSTEM

Testing can be used to assess athletic talent, identify physical abilities and areas in need of improvement, set goals, and evaluate progress. Test results are useful only if the test is valid and reliable. These two characteristics are the key factors in evaluating test quality and must be present for the test to be beneficial.
Given the choice between two valid tests, consideration should be given to simplicity and economy of test administration.

Validity refers to the degree to which a test or test item measures what it is supposed to measure (Polit & Hungler, 1999:418) and it is the most important characteristic of testing. For tests of physical properties such as height and weight, validity is easy to establish. The validity of tests of basic sport abilities is more difficult to establish. There are several types of validity, including construct validity, face validity and content validity.

The consistency is the most important characteristic of testing. For tests of physical properties such as height and weight, validity is easy to establish. The validity of tests of basic sport abilities is more difficult to establish. There are several types of validity, including construct validity, face validity and content validity (Baechle & Earle, 2000:277).

Construct validity is the ability of a test to represent the underlying construct (the theory developed to organize and explain some aspects of existing knowledge and observations. Construct validity refers to overall validity, or to the extent to which the test actually measures what it was designed to measure.

To be valid, physical performance tests should

- measure abilities important in the sport;

- produce repeatable results;
- measure the performance of one athlete at a time;
- be interesting;
- appear meaningful;
- be of suitable difficulty;
- be able to differentiate between various levels of ability;
- permit accurate scoring;
- include a sufficient number of trials;
- stand the test of statistical evaluation.

Content validity is the assessment by experts that the testing covers all relevant subtopics or components abilities in appropriate proportions. For athletic testing, these include all the component abilities needed for a particular sport or sport position. To ensure content validity, the test developer should list the ability components to be assessed and make sure they are all represented on the test.

Face validity is the appearance to the athlete and other casual observers that the test measures what it is purported to measure. If a test or test item has face validity, the athlete is more likely to respond to it positively. The assessment of face validity is generally informal and non quantitative and relates to the appearance of validity by non-experts (Baechle & Earle, 2000:278).

Statistical correlation of the scores from the two administrations provides a measure of test-retest reliability. Any difference between the two sets of scores represents measurement error, which can arise from any of the following factors:

- Intrasubject variability;
- Lack of interrater reliability;
- Intrarater variability;
- Failure of the test itself to provide consistent result.
  (Baechle & Earle, 2000:279).

2.8 RELIABILITY OF THE EXISTING INTERNATIONAL WORLD RUGBY FEDERATION CLASSIFICATION SYSTEM

Reliability is a measure of the degree of consistency or repeatability of a test (Katzenellenbogen, Joubert & Abdool Karim, 1999:9) and procedures are performed according to systems which have proved to be consistent on all players. A test must be reliable to be valid, because highly variable results have little meaning. If an athlete whose ability does not change is measured two times with a perfectly reliable test, the same score is obtained both times (Baechle & Earle, 2000:279).

2.9 THE SPINAL CORD

2.12.1 Introduction

The brain and spinal cord constitute the central nervous system (CNS) and the cranial nerves and spinal nerves form the peripheral nervous system (PNS).The vertebral column and associated soft tissues of the back contains the spinal cord and the proximal parts of the spinal nerves. The major bones of the back are the 33 vertebrae. The number and specific characteristics of the vertebrae vary depending on the body region with which they are associated. The spinal cord lies within a bony canal formed by adjacent vertebrae and soft tissues as protection. There are eight pairs of cervical nerves (C1 to C8), twelve thoracic (T1 to T12), five lumbar (L1 to L5), and one coccygeal (C0) nerve. Each nerve is attached to the spinal cord by a posterior root and an anterior root (Gray's Anatomy, 2005).

2.12.2 Spinal cord injuries

Spinal cord injuries (SCI) can be caused by traumatic and non-traumatic events. Traumatic incidences such as gunshots, stabbings, assaults, sport

injuries, motor vehicle accidents, diving accidents causing impairment or the total loss of motor and/or sensory functions below the level of injury.

Non-traumatic incidences include developmental anomalies (spina bifida), congenital anomalies (angiomatous malformations), inflammation (multiple sclerosis), ischeamia (cord-strokes), infections extrinsically to the spinal cord (osteomyelitis), intrinsically to the cord (transverse myelitis), space occupying lesions both benign and malignant extrinsic or intrinsic to the spinal cord.
Each condition and individual has its own distinctive management needs and features.

SCI players have a partial/total loss off individual muscle function below the lesion of spinal injury.

2.12.3 Evaluation of spinal cord injuries

Assessment is done, using the MMT of individual muscles according to the Oxford scale.

2.13 CEREBRAL PALSY

2.13.1 Definition of cerebral palsy

CP is a brain lesion which is non-progressive and causes variable impairments of the co-ordination, tone and strength of muscle action impacted on postures and movement (Finny,1997:10).

CP is an affliction of the central nervous system that affects the synchronization, co-ordination and smooth integration of normal dissociated alternating functional patterns (CP-ISRA, 2001).

All persons with cerebral palsy have a difficulty in moving purposefully and efficiently, but no two people experience exactly the same difficulties.

2.13.2 CHARACTERISTICS OF CEREBRAL PALSY

Athetoid

A person with fluctuations in postural tone, involuntary movement and intermittent spasms (athetosis) although he can move, does so in a disorganized manner lacking both postural control and stability with constant unwanted movement. (Finny, 1997: Chapter 10). The results of the brain damage is involuntary writhing movements, which are uncontrolled, irregular, and jerky. Often these movements increase with emotion or stress (CP-ISRA, 2001).

Ataxia

A person with ataxia makes clumsy and awkward voluntary movements with intention tremor, co-ordination difficulties with rapid and fine movements, or difficulty with balance and trunk control (CP-ISRA, 2001).

Spasticty

Cerebral spasticity is a state of increased muscle tone with increased reflexes and is inluenced by positioning, stress, temperature and pre-movement stretching (CP-ISRA, 2001).

2.14 MOVEMENT OR MOTOR CONTROL

Normal postural tone provides the background on which movement is based, high enough to withstand gravity, but low enough for easy movement. Both

posture and movement are dynamic and interact to such an extent that they cannot be separated. Postural changes are part of every movement, and movements themselves are, in effect, change in posture (Finnie, 1997:50).

Our muscles work in patterns, and the brain responds to our intention by making groups of muscles, not single muscles work. As adults we never consciously think which components of a movement is going to occur first or which muscles do the work. The highly complex centers in our brain are constantly working to coordinate the vast amount of information arriving by sensory pathways that provide information on, among other things, where we are in space, the position of our limbs and trunk, and the state of readiness of our muscles. The sole purpose of muscles is to generate force. The extent to which the force is generated and released is again controlled by the centers in the brain. Normally the balance is perfect between muscles because of the complexity and precision of the underlying systems that allow us voluntarily to conceive and execute a highly complex task smoothly and in a coordinated manner, all without conscious thought.

The normal child has a natural or built-in ability for adapting his movements to his own satisfaction. The cerebral palsied person is limited to a varying extent to only a few and inadequate patterns of movements that become stereotyped and on which he/she will base whatever skills he/she may acquire (Finnie, 1997:Introduction).

Cerebral palsy is a disorder of movement and posture. People with cerebral palsy often cannot carry out big movements when walking, running, jumping, either at all or nearly as well as normal people. Also, often the fine, manipulative movements that we make with our hands and fingers may be disturbed. Posture (the way we stand, sit or move) is also often abnormal. CP is a non-progressive but not unchanging disorder of movement and posture starting in the early years of life. A baby or child who has had a head injury in a car accident may develop cerebral palsy. If the injury occurs when the child

is older, it will be more like the injury that would appear in an adult (Finnie, 1997:Introduction).

2.14.1 Evaluation of cerebral palsy

The assessment or evaluation of a cerebral palsy child by a therapist/classifier is done by observing the way he moves *spontaneously, the level of the skilled, purposeful effective functional movement patterns when he interacts with the environment.* Observation of the presence of physiological reactions, changes in muscle tone, behavior and responses are important. The movement may be poorly coordinated and therefore abnormally executed, his abnormal patterns of posture and movement affecting all aspects of his development and preventing him from functioning effectively (Finnie, 1997:Chapter 4)

2.15 FORMULATION OF THE PROBLEM

During discussions with coaches and experts training cerebral palsy wheelchair rugby players, ex-players, and potential players, they all formulated the frustrations of pre-game planning and training players in their specific roles (defense and offence) in the team and unfairness of the cerebral palsy players' classifications.

Through observations and experience with cerebral palsy sport people, the researcher feels there is a need to investigate the need for a different approach to the classification bench test format

During the classification process (at present) a cerebral palsy wheelchair rugby player would portray a high upper extremity **point value** on the **bench test** but does not meet the criteria of the **functional profile** during play. This is because cerebral palsy players have got good shoulder, hand and finger movement strength. Due to the complex profile of cerebral palsy their

functional skills can not be rated as normal, thus their performance on court does not meet the functional profile criteria of the IWRF classification system.

Team point totals there are seven classes ranging from 0.5 to 3.5 with functional characteristics identified for each athlete class. In general the 0.5 class includes those athletes with the most disability and the 3.5 class includes those athletes with the least disability or "minimal" disability for the sport of wheelchair rugby.
In international wheelchair rugby the total number of points on court at any time is 8.0. That is, the total points of all four athletes actually playing cannot exceed 8.0 points. A team may play with a line up that totals less than 8.0 points, but not more. (IWRF Manual, 2005).

The implication of this is that the cerebral palsy wheelchair rugby player's quality of play does not fulfill the specific role in the team. This is detrimental to the game of wheelchair rugby as it affects the composition, planning and training of the teams.

The existing IWRF classification system tests the individual muscle strengths of the athlete according to the MMT on the Oxford scale – the present bench test. However, this score does not reflect the true functional abilities of CP quadriplegics, athetoids, double hemiplegias, and ataxic players. The need to develop a better classification system needs attention.

The use of manual muscle testing is valid in normal persons and those with weakness or paralysis secondary to motor unit disorders such as lower motor neuron lesions and muscle disorders. The use of manual muscle testing in persons with disturbances of the higher neural centers (cerebral palsy) is flawed because of interference by abnormal sensation of disturbed tone and motor control (Daniels & Worthingham, 2002:xix).

As the cerebral palsied player does not have muscle weakness or paralysis of a specific muscle he will, therefore, test high on the bench test. This score, however, does not reflect the true ability of the cerebral palsy player and the classification system does not give an accurate picture of the player's functional skills and abilities. To concur with test reliability the classification system in use for cerebral palsy wheelchair player proves to be unreliable.

During an assessment of a cerebral palsy player the classifier observes the way he moves spontaneously, the level of the skilled, purposeful, effective functional movement patterns when he interacts with the environment. Nevertheless muscle function must be assessed in such people although the procedures used may be quite different. Additional tests for these people remain to be codified, and other procedures, which probably will require the use of extensive technology, may be available for routine clinical use at a future time (Finnie, 1997:Chapter 4).

Cerebral palsy swimmers and equestrian athletes are classified using the active-motion test that tests a combination of specific movement for that sport code. A more realistic and reliable point value would be obtained if the bench test, in the classification of cerebral palsy wheelchair rugby players could be modified by using the action-motion test instead of the muscle strength test.

2.16 CONCLUSION

This chapter discussed the literature surrounding the problem of classifying CP wheelchair rugby players using the present IWRF classification process. The research methodology will subsequently be discussed in the next chapter.

CHAPTER 3
Research methodology

3.1 RESEARCH DESIGN

3.1.1 Qualitative Research

Qualitative research is a way of gaining insight through the discovery of meanings, thus improving our comprehension of the whole and is a means of exploring the depth, richness and complexity within a holistic framework.(Burns & Grove 2001:223).

The research technique most often used in qualitative research may be categorized into four basic groups, namely observation, interviewing, the use of documents and the use of audio-visual material (Creswell, 1998;120). The preference for certain techniques is directed by the tradition of enquiry and phenomenological researchers will therefore most often make use of interviewing, either by the use of in –depth individual interviews or focus groups
(Creswell,1998;121).

The flow of reasoning in qualitative research moves from concreteness to increasing abstraction. The reasoning process guides the organization, reduction and clustering of the findings and leads to the development of theoretical explanations. The intellectual processes that are employed in qualitative data analysis are:

- Comprehending: The researcher initially needs to make sense of the data in order to prepare a rich description of the phenomenon under study. Comprehension is completed when saturation is attained.

- Synthesizing: Data is “sifted” and combined or “puzzled-pieced “into an organized whole, thus enabling the researcher to make generalized statements about the phenomenon and the study participants.
- Theorizing: Data is systematically sorted; alternative explanations of the phenomenon are developed and compared to the data until the most parsimonious explanation is obtained.
- Recontextualisin: Theory is developed and applicability to other settings or groups is explored.
  (Burns & Grove, 2001).

According to Polit *et al*. (2001:381) there are three challenges for qualitative researchers:

- Trustworthiness is affected by the lack of consensus on qualitative data analysis and the presentation of qualitative data analysis.
- Qualitative research is time consuming and requires an enormous amount of work.
- In reducing data for reporting purposes, the richness of the original data could disappear.

Research in group dynamics indicates that more ideas are expressed by individuals working alone but in a group environment than by individuals engaged in a formal group discussion. Group consensus can be reached faster and everyone has equal opportunity to present their ideas (Lloyed-Jones *et al.*, 1999).

3.1.2 Nominal group technique

The NGT is a structured activity which facilitates group-based decision-making. The technique takes its name from the fact that the group is a group in name only as individuals work in the presence of others but do not verbally interact for a period of time. The conduct of the session is controlled by a

leader who is a neutral receiver of ideas and consists of several distinct phases. In the early stages, all members of the group are provided with an equal opportunity to present their ideas. Subsequently, these ideas are shared and discussed and an aggregate of opinion within the group is obtained by the use of a voting procedure. It therefore combines both a quantitative and a qualitative methodology (Chapple & Murphy, 2004).

The NGT was originally devised for use as a means of brainstorming the views of a group on a specific problem and of achieving an aggregate of the group's opinions about the solution to the problem. However, it is clear from descriptions of NGT in the literature that it has a flexibility that allows a considerable diversity in its application in a variety of contexts, e.g. librarianship, social work, nursing, vocational training and education. There are several empirical studies providing evidence that when in this context the NGT promotes the identification of ideas and issues that other group activities might suppress (Chapple & Murphy, 2004).

The NGT research design could therefore be regarded as the blueprint for the execution of a study, as it guides the planning and implementing in such a way that the intended purpose of the study is achieved (Burns & Grove 2001:223).

The NGT provides an economical and speedy way of obtaining feedback from students; encourages the participation of individual students restricted the influence of the evaluator and "focuses on the consumer rather than the producer".

The NGT technique will take advantage of pooled judgments. That means that the judgments of a variety of people with varied talents, knowledge, and skills can be used together. By doing this, the resulting ideas are likely to be better than those that might be obtained by other methods. Consensus methods provide another means of synthesizing information. Gathering a wider range

of information, that is commonly used in statistical methods (Dunham 1998:Online).

Consensus methods provide another means of synthesizing information. Gathering a wider range of information, that is commonly used in statistical methods. Where published information is inadequate or non-existent, these methods provide a means of harnessing the insights of appropriate ideas and enable decisions to be made. Two consensus methods commonly used in research are The Delphi process and the Nominal Group Technique. Consensus methods are another means of dealing with wider range of study types to be considered than is usual in statistical reviews. These methods are primarily through qualitative approaches. (Dunham, 1998: Online).

The aim of consensus methods is to determine the extent to which experts or lay people agree about a disadvantage normally found with decision making in groups or committees, which are common during representing vested interest. The term “agreement” takes two forms, which need to be distinguished: firstly, the extent to which each consideration (typical rated on a numerical or categorical scale). Secondly, the extent to which each element of these studies typically assessed by statistical measures of average and dispersion (Dunham, 1998:Online).

This evaluative method will identify relevant outcomes both expected and unanticipated. The participants’ perspective is now legitimately accepted to form part of any evaluative exercise. It combines qualitative and quantitative components in a structured interaction, which minimizes the influence of the researcher, and of group dynamics.(Lloyed-Jones *et al.*, 1999).

The effectiveness of the NGT is therefore partly dependent on the enthusiasm, ability and confidence of the participants themselves to generate constructive and concise ideas. Furthermore, it now seems that the NGT may be more effective at identifying individual rather than group consensus

concerns, and reactions to recent processes of learning rather than overall course content (Chapple & Murphy, 2004).

The researcher had to choose a technique by which information to answer the research question could be gathered in a limited period of time and be reliable, needing experienced people with knowledge of wheelchair rugby and sport for the disabled classification systems.

The use of the time-limited NGT, where data is reduced and verified during the process of data collection, not only greatly reduced the bulk of work, but also preserved the richness of the original data, therefore also addressing issues of trustworthiness (Burns & Grove,2001:591).

3.2 TRUSTWORTHINESS

According to Lloyed-Jones *et a*l. (1999) the NGT has proved a valuable tool in course development due to its ability to reflect the student/participant perspective. The researcher was aware of entering uncharted waters and that predictions based on past experience were of uncertain value. Another advantage claimed for NGT over group interviews is the number of ideas generated in the early phases of the sequence.

The unpredictability of the process is one of several pitfalls for the inexperienced leader who ideally should be a good negotiator and administrator.

The strength of the NGT is that it focuses on the participant's point of view, rather than on that of the researcher. By allowing the participants to generate their own issues and ideas they are stimulated to develop their initial response, in relation to the comments of the group, and through discussion and debate a more elaborate group view can be gained, building upon individual views. The NGT step where ideas are clarified provides an

opportunity for group members to question and even challenge what someone else has suggested. This requires members to substantiate and expand their views. If they had completed a questionnaire or participated in a traditional discussions group instead of the NGT it is likely that their responses might have been more immediate, less thoughtful and subsequently of less value.

In each use of the technique the researchers have consistently found that the group process allows initial individual views to be developed and expanded. The end result of such a process frequently confirms the utility of the NGT approach (Lloyed-Jones *et al.,* 1999).

Despite some caution Lloyed-Jones *et al*. (1999) were sufficiently encouraged by the results to continue and extend the NGT process within their program of evaluation. In their conclusion they endorse the inclusion of the nominal group technique as a useful tool in subject evaluation. It is a cost effective and speedy means of tapping the participant perspective. This method will help to illuminate the current debate about the nature of the consensus central to the method.

Dunham (1998:Online) lists the following advantages and disadvantages of the NGT:

Advantages

- Balance participation across members.
- Balance influence of individuals.
- Produce more creative ideas than interacting groups.
- Produce a greater number of ideas than do traditional interacting groups.
- Results in greater satisfaction for participants.
- Reduce the conforming influence common to most face to face group meetings.
- Encourage participants to confront issues on a problem-solving basis rather than on a personal assault basis.

- Lead to greater sense of closure and accomplishment for members (as the results are available immediately after the session).
- The ease of interpreting the results (as ideas are generated, voted on and evaluated at the session itself).
- The minimal resource requirements (a venue, facilitator, flip chart, paper, and pens).
- The comparatively efficient use of time.
- The structured interaction, which minimizes the influence of the researcher.
- The increase of trustworthiness ascribed to the verification and reduction of data by the participants.

Disadvantages

- Require extended advance preparation.
- Tend to be limited to a single-purpose, single-topic meeting.
- Need agreement from all participants to use the same structured method.

Jones (2004;24) states the importance of recognizing the advantages or disadvantages of nominal groups and has compiled a comprehensive list taken from the work of several specialists in the field, as follows:

- The limited number of topic and issues that can be covered (tend to be single–topic sessions).
- The limitation of ideas generation to the meeting itself (i.e., no opportunity for participants to think about the issue in depth).
- The need for participants to feel comfortable with, and to remain within, a very structured group process.
- The lack of anonymity, which may limit participants' willingness to express their views.
- The necessity for all members to be capable of, and comfortable with, expressing their ideas in writing and then communicating them verbally to the group.

- The time commitment required from participants and the necessity for them to attend a specific location at a given time, which may limit participation numbers.
- The lack of generalizability of the results to the wider population due to the specific characteristics of the participants (both in terms of who is nominated to attend and who agrees to participate).
- The limited nature of the data (i.e. in terms of number of respondents) often requires a follow-up survey or other quantitive methodology prior to making final decision about an issue.
- The NGT is only effective as an evaluation method if the items collected are representative of the views of the whole group.
- The timing can have a major impact on the number of participants attending and the number of ideas generated.

These disadvantages are actually contributing to the trustworthiness in this study as a single concept/question “Does the existing IWRF classification system disadvantage CP players?” was explored. (Chapple & Murphy, 2004).

The NGT is only effective as an evaluation method if the items collected are representative of the views of the whole group. In this study the population consisted of internationally qualified classifiers and a technical commissioner.

- The timing had a major impact on the number of participants attending and the number of ideas generated. The session for this study had to be scheduled between wheelchair rugby matches while players had a break before preparing for the next match, as some of the participants had to officiate games. The session was monitored and strictly adhered to the allocated time for each section of the research process.
- The venue was in a locker room selected at the indoor center where the tournament was hosted and was big enough to accommodate 8 people in comfort.

- In this study the facilitator was familiar with the NGT as she is a professor in Physiotherapy at a University in Minnesota.

3.3 STUDY METHOD

This study method is a qualitative approach using the NGT. The researcher was challenged to choose a technique by which the information necessary to achieve the purpose of this study could be gathered within the limited period of time available. The NGT won the bid as this technique promised to:

- Gather the data within limited time available.
- Be participant friendly in the sense that the structured process could provide security and participation in data analysis could enhance a sense of accomplishment and satisfaction, whilst minimizing suspicion with regard to possible research bias.
- Reduce the bulk of work usually associated with qualitative data analysis.

From a research perspective, these aspects cannot be regarded as limitations, but actually contribute towards increased trustworthiness. In this study, the single purpose was to explore the experience of wheelchair rugby specialist, using the existing classification system classifying cerebral palsy rugby players. The participants in this study were not given a choice with regard to the use of the method or technique.

3.4 RESEARCH PROCEDURE

3.4.1 Sampling

Burns and Grove (1997;41) define sampling as a process of selecting subjects who are representative of the population being studied. A sample is therefore a subset of the population (Polit *et al.*, 2001:234).

The researcher did not make use of sampling, as an opportunity never presented itself to have a group of expertise with the level and quality of experience of the study population.

3.4.2 Pilot study

As already said, a pilot study is a smaller version of the proposed study in preparation for the major study and may not form part of the eventual population group in the final research study (Burns & Grove 2001:49).

The researcher could not gather a group of people in South Africa with adequate experience in wheelchair rugby to do a trial run in preparation for the major study.

3.4.3 Study population

The population is the entire set of individuals having some common characteristics or who meet the sampling criteria for inclusion in a study (Burns & Grove, 2001:366; Polit & Hungler, 2001:467).

According to this prescription, the population group used for this study consisted of seven people namely

- three occupational therapists in lecturing posts from Canada, New Zealand and the USA;
- one occupational therapist from South Africa as trainee;
- two professors in physiotherapy from Chili and Argentina;
- one International Technical Commissioner for sanctioned competitions from Canada.

In table 3.1 on the next page information regarding the research population is given.

TABLE 3.1 Research population

Population	Occupation	Wheelchair rugby profile	Country	Years of experience
1	Occupational therapist lecturer	International Level 4 classifier	Canada	8
2	Occupational therapist lecturer	International Level 4 classifier	New Zealand	15
3	Occupational therapist lecturer	International Level 2 classifier	USA	6
4	Occupational therapist	Classification trainee	RSA	3
5	Professor in Physiotherapy	International Level 2 classifier	Chili	10
6	Professor in Physiotherapy	International Level 2 Classifier	Argentina	8
7	Faculty/Dept of Information Studies: Student counselor	Technical and Competition Commissioner IWRF	Canada	20

3.5 DATA COLLECTION

Data collection is defined as the systematic gathering of information needed to address the research problem or relevant to the research purpose (Burns & Grove 2001:794; Polit *et al*., 2001:212). Creswell (1998:110) visualizes data collection as a series of interrelated activities aimed at gathering good information to answer the research questions.

The NGT was used to collect data and is a highly structured qualitative technique to gather information from relevant experts about a given issue.

The technique involves generation, recording, discussion and voting on ideas, thus taking advantage of pooled judgments (Dunham, 1998:Online).

The results of NGT are claimed to represent the consensus view of the group but this is not universally accepted. The debate revolves around the degree to which group dynamics influenced the NGT process; essentially, whether the group dynamics are controlled can be equated with those of a freely interacting one

NGT is a useful tool it is cost effective and speedy means of tapping the participant perspective with much to commend it when education is undergoing change. (Lloyed-Jones *et al.*,1999).

3.5.1 Preparation for the nominal group session

On selecting a suitable venue the researcher had to improvise to adhere to the criteria and recommendations of Creswell (1998:124) and Dunham (1998:Online). A big enough locker room was chosen which had a bench along the one wall. Ideally the room needed to be larger to seat the participants comfortably and creating an atmosphere of comfort, but due to circumstances it could not be done. As already mentioned the NGT was adapted to the unavoidable circumstances and all the participants were obliging.

Figure 3.1: Venue and participants seated

The venue had to be at the indoor sport centre as the participants were actively involved in the games in various capacities as classifiers and as technical officials and the NGT took place during a break between the games.

Participants had to be able to work in silence with no environmental distractions. The most convenient time was schedule between 11h00 and 12h00 when there was no game in progress. As wheelchair rugby is a full contact sport the chairs continuously bang into each other and constant whistle blowing is heard - thus making the game a very loud and noisy affair.

The flip chart was constructed out of two cardboard boxes stacked on top of each other on a moveable chair in the opposite corner from the bench. Four A1-pages were taped to the back of the boxes to serve as flip chart.

Figure 3.2: Self-made flip chart

A consent form was circulated and each participant signed the form. (Appendix D) Three blank pages and a pen were handed to the participants for jotting down of ideas.

3.5.2 Conducting the nominal group session

The participants and the facilitator settled in and positioned themselves on the bench to have a full view of the flip chart. The NGT as described by Chapple and Murphy (2004) and Lloyed-Jones *et al*., (1999) was used. (Table 3.2)

Table 3.2 Steps followed in conducting the nominal group technique

Steps	Time allocation	Steps of Activity description
Step 1	10 minutes	Introduction: ▪ Welcoming of participants ▪ Explanation of NGT. ▪ Clarification of the role of the facilitator ▪ Group objectives ▪ Individual participation Research question: "Does the existing IWR classification system disadvantage cerebral palsy rugby players?"
Step 2	20-30 minutes.	Silent generation of ideas • Generation of the list of items in a "Round Robin" order • Facilitator writes all the ideas on the flip chart
Step 3	10 minutes.	• Clarification of items • Discussion of each idea Selection of ideas into 5 main groups
Step 4	5 minutes.	▪ Silently voting: allocating a numerical value 1-5 to each of the groups ▪ All the values allocated to each concept are written down on the flip chart ▪ The facilitator calculated the total score for each theme ▪ Closure

3.5.3 Detailed outlay of the four steps followed during the nominal group session

Introduction. The researcher introduced herself and the facilitator followed by welcoming everybody and thanked them for being willing and available to participate in the study despite their busy schedule.

Explanation of the NGT. The steps of the session were briefly explained. To ensure that all the participants understood the process the researcher discussed the process according to the following:

- *Nominal group process*. The steps of the session were explained and questions answered on any uncertainties.
- *Clarification of the role of the facilitator*. A facilitator conducted the research as the researcher wanted to observe the process to minimize any biased decisions.
- *Group objectives*. The object was to accurately describe their experience of the classification system presently used for CP wheelchair rugby players. They were asked to respond openly and honestly to the question posed in order to sensibly prioritize ideas generated during the session.
- *Individual contributions and participation*. The value of each contribution was emphasized.

(Dunham, 1998:Online)

The research question. The following question was posed verbally:
"Does the existing IWR classification system disadvantage cerebral palsy rugby players?"

The researcher then handed the procedures to the facilitator.

Step 1 (10 minutes)

Silent generation of ideas. The participants were given ten minutes to write down their ideas in brief statements on the paper provided. During this phase individuals considered as many responses to the question privately, in silence and wrote them down. Interaction was discouraged to prevent individuals dominating the process.

Factors that were avoided were internal and external

- Interruptions;
- an undue focusing on a small number of ideas;
- competition, status pressure and conformity pressure;
- choosing between ideas prematurely.

Step 2 (20-30 minutes)

The Round-Robin phase. The Round-Robin recording of ideas started with the generation of a list of items. Each group member in turn presented, but did not discuss, one of the ideas on his/her list. The ideas created in the silent phase were recorded in numerical order on the left side of the flip chart. The facilitator then asked each person for a second idea, in a Round-Robin fashion, until all ideas were recorded as they were presented. Participants were requested not to duplicate ideas by repeating an item already listed, but to proceed to the following item on their list. Sixteen ideas where generated during this phase.

Continue on next page…

An illustration of the Round-Robin technique is seen in Figure 3.4

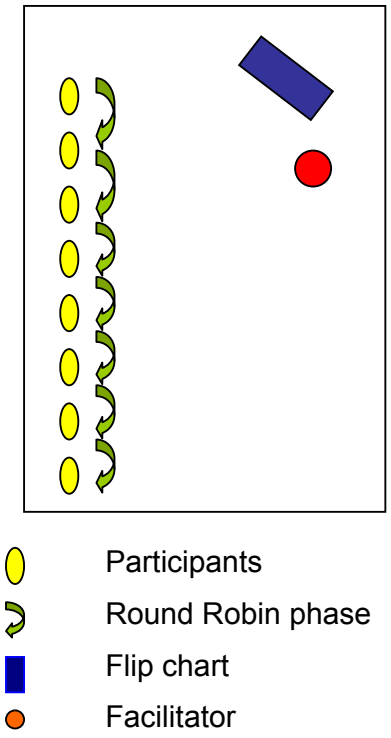


Figure 3.3: The Round-Robin technique

The advantages of the Round-Robin approach includes:

- Equal participation in the presentation of ideas.
- An increase in “problem-mindedness”.
- Depersonalization (the separation of ideas from personalities).
- An increase in ability to deal with a large number of ideas.
- Tolerance of potentially conflicting ideas.
- Encouraging of hitch hiking. (An idea listed on the chart by one member might cause another member to think of a new idea. When this occurs, the second member should add the new idea to his or her personal worksheet to be presented to the group when his or her turn for presenting an idea arrives);
- A written record and guide.

(Dunham 1998:Online).

The following suggestions for the facilitator were incorporated (Dunham 1998:Online):

- Number and record each idea on the flip chart.
- Allow a person to “pass” if they have no new ideas (but allow them to re-enter later, if they wish).
- Record ideas as rapidly as possible.
- Record ideas in the exact words of the group member.
- Make the entire list of ideas visible to the entire group.
- Allow only a listing of ideas, but no discussion or debate.

The next figure shows the recording of ideas in the Round-Robin phase.

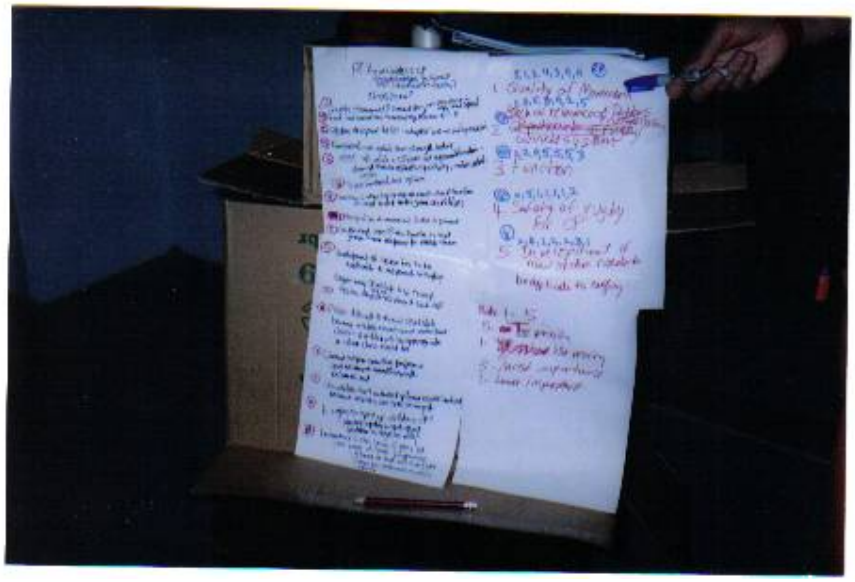


Figure 3.4: Recording of ideas in the Round-Robin phase

Step 3 (10 minutes)

Discussion and grouping of ideas. On completion of Step 2 the facilitator moved the flip chart closer to the participants and they sat in a circle while discussing and clarifying the meanings of the listed ideas. (See figure 3.6)

The facilitator read each numbered idea on the flip chart and ensured that the meanings were clear. She asked if here were any questions or interpretation or explanation needed. The facilitator started at the top of the list, reading it out loudly and the group discussed each idea. The participants came to the consensus that the sixteen ideas generated in the Round-Robin phase could be divided into five main groups. The groups were written in a different color pen on the right side of the flip chart.

Figure 3.5: Group discussion

The advantages of the group discussion are:

- avoiding focusing unduly on any one idea or subset of idea.
- providing an opportunity for clarification and elimination of misunderstanding.
- providing an opportunity to present the logic behind an idea or disagreement.
- allowing for recording of difference of opinion without undue arguments.

(Dunham, 1998:Online)

The effectiveness of the NGT is therefore partly dependent on the enthusiasm, ability and confidence of the participants themselves to generate constructive and concise ideas (Chapple & Murphy: 1990).

The participants were not allowed to grade or discard items; they just edited overlapping and duplicated items. The process was monitored by the researcher to ensure that group dynamics did not result in item deletion (Lloyed-Jones *et al.,* 1999).

Selection and prioritizing ideas into groups. The purpose of this step is to aggregate the judgments of the individual participants to determine the relative importance of each individual idea (Dunham 1998:Online).

The facilitator wrote the final five groups, identified and unanimously agreed upon by the participants during step 3 in no specific order of priority on the flip chart.

Step 4 (5 minutes)

Voting process. Participants where asked to allocate a numerical value of one to five to each of the groups with the number five the most important group and one the least important. The numbers of the groups were written

on the left side of the page provided and next to the number the score value the participant rated that specific theme. This was done in silence and collected immediately.

Writing up data. The facilitator prepared a tally sheet on the flip chart corresponding to the numbers of the groups generated during the Round-Robin phase. The ratings of the participants were read aloud by participant number two. Participant number three confirmed the correctness of the ratings read out loud. The rest of the participants were asked to check for accuracy as the facilitator recorded the values on the tally sheet.

Calculation of the scores. The facilitator and the participants calculated the total score for each group and recorded the results.

Closure. The facilitator thanked the participants for their time and effort in assisting the researcher in the study. All the participants commented on the process as being very clear, successful and addressed the research question spot on. Further discussions had to be a banded as everybody involved in the next round of games had to be at their officiating posts before the next game started.

3.5.4 Safeguarding of data

Burns and Grove (2001:201,202) recommended that the original data collecting tools be locked in a secure place and Berg (2001:59) urges researchers to take intentional precautions to prevent accidental disclosure of information. The following precautions were taken to ensure securing of the data in this study:

- A close with regard to confidentiality was included in the consent form. (Appendix D)
- The data was discussed with no unauthorized person.
- No names were attached to the raw data.

- The raw data is held in safekeeping at the home of the researcher and a copy of the research report, in computer disc format, will be securely kept at the Department of Physiotherapy, in case of enquiries or follow-up studies.
- A backup copy was made of all computer files.

3.6 DATA ANALYSIS

The purpose of qualitative data analysis is reducing, organize, and provide structure to and elicit meaning from data (Burns & Grove, 2001:381). Two distinctive characteristics of qualitative data analysis are that data collection and analysis take place concurrently and that words rather than numbers are used as the basis of analysis (Burns & Grove, 2001:591). The data collection and analysis of this study took place simultaneously with the help of the facilitator and the participants.

3.7 ETHICAL ASPECTS

The process of data collection was done in accordance to the prescribed qualitative research methods as described in chapter 1. Access to participants was gained by submitting the research protocol for review by the different research and ethical committees and the informed consent form used in this study (Appendix D) was designed to meet the criteria that Creswell (1998:115) requires. (Please refer to 1.6.)

Although the participants could not be noted in writing, the participants were verbally briefed. They were requested to sign consent after having been granted enough time to familiarize them with the content of the form.

3.7.1 Anonymity and assurance of confidentiality

Polit *et al.*, (2001:82) explain that anonymity occurs when even the researcher cannot link a participant with his or her data. Anonymity is therefore not wholly possible in qualitative research as the researcher has face-to-face contact with each participant (Berg, 2001:58).

Confidentiality was pledged during the process of obtaining informed consent, thereby compelling the researcher to protect the privacy of the participants by taking the following measures as recommended by Berg (2001:59).

- The researcher's copies of the consent forms were securely filed and kept separately from the study data.
- No names were attached to the raw data, i.e. the flip chart or voting papers of participants.
- The researcher took care not to discuss data with unauthorized persons, thus taking precautions against indiscriminate disclosure.

3.8 CONCLUSION

In this chapter report has been given of the research process of study. The results and findings of the study will subsequently be discussed in the following chapter.

CHAPTER 4
Discussion of results

4.1 INTRODUCTION

The previous chapter dealt with the process of data collection. In this chapter the ideas and groups proposed by the participants will be discussed. The management of the raw data will be explained in detail and the final analysis tabulated.

4.2 IDEAS GENERATED DURING THE ROUND-ROBIN PHASE

The raw data from the flip chart was transferred in a tabulated form on the computer for easy reading and evaluated to define clear discussions.

The original 16 ideas generated in the Round-Robin phase are listed in table 4.1. It is presented in the original words of the facilitator and participants.

Table 4.1: Script version copied from the flip chart

IDEA NUMBER	IDEAS GENERATED IN THE ROUND-ROBIN PHASE
1	Quality of movement ↑ if movement slow – need more in rugby – needs speed
2	Trunk but cannot use advantage but score as 1.0
3	System designed for SCI – adapted but not fairly assessed
4	Functional more useful than strength testing
5	MMT – not valid with CP does not represent function – does not include reflexes, spasticity, motor control, ataxia.
6	Need functional test system
7	Function ↓ when try use on court – need function on court tested under game conditions
8	No quality of movement tested at present

9	Go through MMT 1st – then function test - longer ↓ more confusing for athlete + team
10	Development of system has to be applicable to movement in rugby
11	Require every CP athlete to go through system despite relevance of bench test
12	Makes difficult to recruit CP athletes because athlete + teams cannot understand class+ if athlete will be appropriate or what class might be
13	Classed higher than they perform or can't because of muscle strength on bench test
14	Other athletes don't understand - classed over functionality because athletes see their strength
15	Is rugby the sport for athletes with CP? – can participation in sport affect condition in negative way?
16	Performance ↓ over course of game but class based on peak performance – if based on best will ↓ during game – if class low performance too good in beginning

4.3 DISCUSSION AND CLARIFICATION OF THE IDEAS

1 Quality of movement increased when movement is slow but when playing, quality reduced as rugby is played at a fast speed and pace

Spasticity is seen commonly effecting speed, co-ordination and movement on the court.

Movement is characterized as spontaneous and random with involuntary reflex activity sometimes interfering. An adult is capable of performing complex voluntary and purposeful tasks (Finnie, 1997: Chapter 5).

Normally the balance is perfect between muscles because of the complexity and precision of the underlying systems that allow us voluntarily to conceive and execute a highly complex task, smoothly and in a co-coordinated manner, all without conscious thought. The sole purpose of muscles is to generate

force. The extent to which the force is generated and released is again controlled by the centers in the brain (Finny, 1997: Chapter 8).

2 **The CP player will score 1.0 point for the trunk but cannot use the trunk to full advantage during play.**

Normal postural tone (trunk) provides the background on which movement is based, high enough to withstand gravity, but low enough for easy movement. Both posture and movement are dynamic and interact to such an extent that they cannot be separated. Postural changes are part of every movement, and movements themselves are, in effect, change in posture (Finnie,1997: Chapter 5).

A child (wheelchair rugby player) with low postural tone (hypotonia/ataxia) will have excessive in co- ordination of voluntary movement and difficulty in timing and grading of movement (Finnie, 1997: Chapter 5).

3 **The existing bench test system is designed to test SCI players on the MMT. At present classifiers try to adapt the existing system but the players are not fairly assessed**

Kendall and Kendal had developed a percentage system ranging from 0 to 5 to express muscle grades as a reflection of normal. The use of manual muscle testing is valid in normal persons and those with weakness or paralysis secondary to motor unit disorders (lower motor neuron lesions) and muscle disorders (Daniels & Worthinghamn, 2002).

4 **There is a need for more functional skills tests; the existing bench test system does disadvantage CP athletes when tested on the MMT system**

Muscle testing techniques used in persons with disturbances of the higher neural centers (CP) are flawed because of interference by abnormal sensation, disturbed tone or motor control. Nevertheless muscle function must be assessed in such CP patients, although the procedures used may be quite different. Additional tests for these people remain to be codified, and other procedures, which probably will require the use of extensive technology, may be available for routine clinical use in future (Daniels & Worthinghamn, 2002).
.

5 **MMT is not valid with CP players. The test completely disadvantages CP players. The test does not represent function – considering co-ordination, spasticity and other related deficits as the CP player does not have normal reflexes (with the startle reflex still present). They present with spasticity, motor control problems and ataxia, MMT does not correlate with functional skills performed on court**

The clinical implications of different clusters of neurological signs will differ from person to person. We are looking at every heterogenous group of people. The natural history of the different types of CP, and CP as a whole, has not been documented.

Spasticity, one of the underlying impairments of CP, is being used interchangeably with hypertonia, without differentiating neural hypotonia from secondary “peripheral” based hypertonia. Clinical measurement means of spasticity have not been shown to reliably differentiate primary/neural hypertonia from secondary hypertonia. “No one test accurately reflects the basic pathophysiological substrata of spasticity (Capelovitch, 2005:5).

During an assessment of a CP child a therapist observes the way he moves spontaneously, the level of the skilled, purposeful, effective functional movement patterns when he/she interacts with the environment. Observation of the presence of physiological reactions, changes in muscle tone, behavior and responses. The movement may be poorly co-ordinated and therefore

abnormally executed, the abnormal patterns of posture and movement effecting
all aspects of his/her development and preventing him/her from functioning effectively (Finnie:1997:Chapter 4)

6 **There is a need for a functional bench test score system. The existing bench test using the MMT system does not give any indication of speed or co-ordination of movement**

Primary changes in CP are present at onset. Spasticity is velocity dependent and is due to an increase in the monosynaptic stretch reflex. This is tested by elongating muscle groups quickly. Spasticity is characterized by:

- Delay in movement onset, increased latency.
- Poor timing of force generation.
- Poor force production.
- Decrease speed of movement.
- Increase co-contraction.
- Inability to maintain anti-gravity control.

Secondary changes in CP occurs over time and are characterized by:

- Reduced range of movement.
- Reduced joint mobility.
- Reduced bone mineralization and density.
- Impairment muscle growth.
- Decreased number of sarcomeres – hypo-extensibility.
- Stiffening of elastic structures (increased collagen), causing
    - Further reduction of muscle power;
    - Reduced endurance;
    - Reduced participation.

(Capelovitch, 2005:5)

Wheelchair rugby classification procedures are performed according to an existing classification system, which have been proven to be consistent on all players except CP players. (Appendix A)

Testing can be used to assess athletic talent, identify physical abilities and areas in need of improvement, set goals, and evaluate progress. Test results are useful only if the test is valid and reliable. These two characteristics are the key factors in evaluating test quality and must be present for the test to be beneficial (Baechle & Earle, 2000:277).

For a test to be reliable there must be a measure of the degree of consistency or repeatability of a test (Katzenellenbogen *et al.*, 1999:90).

7 The CP player's function decreases when playing on court. There should be a test to test the players function on court under the same conditions as presented during a game on court.

Where the normal person can adapt to movements to his/her own satisfaction, the CP is limited to a few patterns of movement that become stereotyped. He/she now uses these movements to base other skills on.

8 At present there is not a test to score quality of movement in wheelchair rugby classification system

There are many motor control problems in the athlete with CP causing spasticity, athetosis, or ataxia.

CP is an affliction of the central nervous system that affects the synchronization, co-ordination and smooth integration of normal dissociated alternating functional pattern. All persons with CP have a difficulty in moving purposefully and efficiently, and have difficulty in timing and grading of movement regarding gross motor skills and fine hand motor skills. No two people experience exactly the same difficulties. The movement may be poorly

co-ordinated and therefore abnormally executed. The abnormal patterns of posture and movement affect all aspects of the person's normal movement and preventing him/her from functioning effectively. Muscles work in patterns, and the brain responds to the intention by making groups of muscles, not single muscles work (Finnie:1997:20).

9 At present the classification system goes through the MMT first then functional skills tests. The classification process takes longer than other athletes. This is causing confusion for other athletes and teams, not understanding the process.

At present during the classification process, a CP wheelchair rugby player would portray a high upper extremity point value on the bench test but does not meet the criteria of the functional profile during play. The implication of this is that the CP wheelchair rugby player's quality of play does not fulfill the specific role in the team. This is detrimental to the game of wheelchair rugby as it affects the composition, planning and training of the teams.

As the cerebral palsied player does not have muscle weakness or paralysis of a specific muscle he will, therefore, test high on the bench test. However, this score does not reflect the true ability of the CP player and the bench test in the first stage of the classification system, does not give an accurate picture of the player's functional skills and abilities. To concur with test reliability the classification system in use for CP wheelchair players proves to be unreliable.

According to Baechle & Earle (2000:277) the following questions explore the consequences that help explain why a problem exists and why intervention has been attempted:

For whom is the situation a problem? The situation is a problem for wheelchair rugby classifiers who must classify CP players. They find it difficult to classify the players in their correct classes.

What are the negative consequences of the problem for the players? The inconsistency of the classification process is a problem for the players. The player's classifications are being changed at every classification session.

Who will benefit from the research? The wheelchair rugby fraternity of South Africa as game plans and tactics can be planned more consistently and the level of play will be lifted to a higher standard of excellence.

10 Development of a new system has to be applicable to functional movement in rugby and must be proved that tests represent functional profiles

A new system can be developed by knowledge acquisition involving identifying and selecting relevant types of knowledge (other classification systems) and using and integrating appropriate sources of information (classification systems for sport for the disabled). Particular useful sources are existing forms of archival information (IWRF Classification System) and natural examples of successful practices of individuals and organizations (De Vos, 1994:31,32)

During classification of a CP swimmer with spasticity/ataxia and/or athetosis he/she will be tested with an active tempo-motion test. The test takes into account the co-ordination and/or free mobility with the spasticity and/or athetosis. The sequence of movement must be tested as alternating, of the upper limbs. Simultaneous movement of the upper and lower limbs should also be taken into consideration. Associated reactions have to be watched carefully. A CP swimmer is to be scored on controlled movement (IPC Swimming Classification & Technical Advisers' Manual:2001).

Cerebral spasticity is a state of increased muscle tone with increased reflexes. This may fluctuate depending on various conditions including: posture, positioning, stress, temperature and pre- movement stretching. Spasticity usually involves the flexor muscle groups (bending muscles) of the

upper extremities and the extensor muscle groups (straightening muscles) of the lower extremities (CP-ISRA, 2004:23)

11 The existing process is being unfair towards the CP athlete. They have to go through the system despite the lack of a relevant bench test

Measuring faults can occur in the following instances:

- Not using checklists in the process to facilitate observation of behavior of/and specific characteristics of movement skills.
- If classifiers can not use rating scales correctly.
- If the quality of movement is in itself a very subjective observation. This can be interpreted differently by different classifiers.
- A lack of experience working with adult cerebral palsied can influence the interpretation of a skilled movement if the classifier has not got a good ground knowledge of the functional profiles of the rugby players (Baechle & Earle, 2000:279).

12 The existing classification system makes it difficult to recruit CP athletes because athletes and teams have no idea to allocate an appropriate or a estimated class to a CP athlete start playing

Wheelchair rugby has grown into an intense, physical team sport for both male and female with a variety of disabilities involving all four limbs. Wheelchair rugby is rapidly developing throughout the world with the majority of competitors' athletes with spinal cord injury. As CP wheelchair rugby players differ completely from the spinal cord rugby player the classifiers find it extremely difficult to put them in a estimated class. This discourages the present CP players and make it difficult to recruit new CP wheelchair players.

13 The CP athlete will at present be classified with a higher point score on the existing bench test than he/she will portray performing on court as the present bench test consists of a manual muscle test

The CP athlete will at present be classified with a higher point score on the existing bench test than he/she will portray performing on court. The reason for the abovementioned is that the present bench test consists of a MMT.

Validity refers to the degree to which a test or test item measures what it is supposed to measure (Polit & Hungler, 1999:418) and it is the most important characteristic of testing. For tests of physical properties such as height and weight, validity is easy to establish. The validity of tests of basic sport abilities is more difficult to establish. There are several types of validity, including construct validity, face validity and content validity. (Baechle & Earle, 2000:277)

To be valid, physical performance tests should

- measure abilities important in the sport
- produce repeatable results
- measure the performance of one athlete at a time
- be interesting
- appear meaningful
- be of suitable difficulty
- be able to differentiate between various levels of ability
- permit accurate scoring
- include a sufficient number of trials
- stand the test of statistical evaluation

Given the choice between two valid tests, consideration should be given to simplicity and economy of test administration (Baechle & Earle, 2000:277

Face validity is the appearance to the athlete and other casual observers that the test measures what it is purported to measure. If a test or test item has face validity, the athlete is more likely to respond to it positively. The

assessment of face validity is generally informal and nonquantitative and relates to the appearance of validity by non-experts (Baechle & Earle, 2000:278).

Content validity is the assessment by experts that the testing covers all relevant subtopics or components abilities in appropriate proportions. For athletic testing, these include all the component abilities needed for a particular sport or sport position. To ensure content validity, the test developer should list the ability components to be assessed and make sure they are all represented on the test. (Baechle & Earle, 2000:278) (Appendix B)

14 At present other athletes don't understand the classes as the CP player will be classified into the lower functionality classes but they know the athlete has a higher muscle strength profile on the bench test

Experienced international classifiers find it difficult to classify CP wheelchair players. It is understandable that the lay person will encounter problems interpreting and understanding the classification process and query the final outcome of the process. The comments of the participants in the NGT prove this statement.

15 Wheelchair rugby was originally not developed as a sport for athletes with CP. At present their participation in the sport of wheelchair rugby affect them in a negative way

The first classification system for wheelchair rugby was medically based and there were three classes, largely determined by medical diagnosis and level of spinal cord injury. In 1991 the system was changed to a functional classification system unique to the sport of wheelchair rugby. This was done for reasons, including the need to have a system that would accommodate the growing number of athletes both with and without spinal cord injury including CP athletes (IWRF Manual, 2005). Since this functional classification system

does not accommodate CP wheelchair players to the full, their participation affect them in a negative way.

16 **Their performance reduces during the course of the game but the classification class is based on peek performance. If classification is based on peek performance the functional skills profile will be reduced during a game – if classification class is too low, the performance of functional skills profile will be too good/high in the beginning of the game**

When CP players are performing the bench test they will test high but when playing and muscle tone increases they will test lower on functional profile. They will therefore not be able to perform the function acquired for that classification.

4.4 GROUPING OF IDEAS

Table 4.2 shows the five main groups that were agreed upon during the nominal group session.

Table 4.2: Main grouping of ideas

GROUPS	NUMBERS OF IDEAS
Quality of movement	1, 8
Lack of relevance and problems with current classification system	3, 5, 9, 11, 12
Function	2, 4, 6, 7, 13, 14, 16
Safety of rugby for CP wheelchair players	15
Development of new system needs to be relevant to wheelchair rugby	10

4.4.1 Different groups

In table 4.1 the script version of all the ideas was shown. As clarification on the meanings of the different participants the complete sentences are presented below.

Quality of movement *(2 ideas)*

1 Quality of movement increased when movement is slow but when playing, quality reduces as wheelchair rugby is played at a fast speed and pace. Spasticity is commonly seen affecting speed, co-ordination and movement on the court.

8 At present there is not a test to score quality of movement in the wheelchair rugby classification system.

Lack of relevance and problems with the current classification system *(5 ideas)*

3 The existing bench test system are designed to test SCI players. At present classifiers try to adapt the MMT in the existing system but the players are not fairly assessed.

5 The MMT is not valid with CP players. The test completely disadvantages CP players. The test does not represent function, considering co-ordination, spasticity and other related deficits as the CP player does not have normal reflexes and the startle reflex is still present. They present with spasticity, motor control problems and ataxia – the MMT does not correlate with functional skills performed on the court.

9 At present the classification system goes through the MMT first then functional skills tests. The classification process takes longer than with other athletes. This is causing confusion for other athletes and teams as they do not understand the process.

11 The existing process is being unfair towards the CP athlete. They have to go through the system despite the lack of a relevant bench test.

12 The existing classification system makes it difficult to recruit CP athletes, because athletes and teams have no idea to give an appropriate or an estimated class to an athlete to start playing.

Function *(7 ideas)*

2 The CP player will score a one point for the trunk but can not use the trunk to full advantage during play.

4 There is a need for more functional skills tests; the existing bench test system does disadvantage CP athletes when tested on the muscle motor testing system.

6 There is a need for a functional bench test score system. The existing bench test using the MMT system does not give any indication of speed or co-ordination of movement.

7 The CP player's function decreases when playing on court. There should be a test to test the players function on court under the same conditions as presented during a game on court.

13 The CP athlete will at present be classified with a higher point score on the existing bench test than he will portray performing on court.

14 At present other athletes don't understand the classes as the CP player will be classified into the lower functionality classes but they know the athlete has a higher muscle strength profile on the bench test.

16 Their performance reduces during the course of game but the classification class is based on peek performance. If classification is based on peek performance the functional skills profile will be reduced during a game. If classification class is too low, the performance of the functional skills profile will be too high in the beginning of the game.

Safety of rugby for the cerebral palsy wheelchair player *(1 idea)*

15 Wheelchair rugby was originally not developed as a sport for athletes with CP. At present they participate in the sport of wheelchair rugby affecting them in a negative way.

Development of new system needs to be relevant to wheelchair rugby *(1 idea)*

10 Development of a new system has to be applicable to functional movement in rugby and must be proved that tests represent functional profiles.

4.5 ANALYSIS

Participants were asked to allocate a numerical value of one to five to each of the groups. A tally sheet was prepared and the ratings of the participants documented. Table 4.3 shows the detailed results.

Table 4.2: Voting scores

MAIN GROUPS	IDEAS	VOTING DATA	RESULTS
Quality of movement	1,8	5,1,3,4,3,4,4	24
Lack of relevance of the existing system	3,5,9,11,12	1,3,5,3,4,2,5	23
Function	2,4,6,7,13,14,16	3,2,4,5,5,5,3	27
Safety of rugby for CP wheelchair players	15	4,5,1,1,1,1,2	15
Development of a new system to be relevant to wheelchair rugby	10	2,4,2,2,2,3,1	16

4.6 CONCLUSION

The results of the nominal group session were discussed in this chapter. The ideas of the participants regarding the current classification system for wheelchair rugby players were described. In an attempt to optimize the objectivity of reporting, the results were compared to literature.

The findings, conclusions and recommendations flowing from the study will be discussed in the final chapter.

CHAPTER 5

Research findings and recommendations

==========

5.1 INTRODUCTION

Having attempted to efficiently answer the question “Does the existing wheelchair rugby classification system disadvantage cerebral palsy rugby players?” by using the NGT, the researcher will attempt to recommend a possible solution to address the problem set out in the research question.

5.2 RECOMMENDATIONS

1 The findings of this study and the conclusions reached indicated that there is a definite need for a different and more functional approach to bench test CP wheelchair rugby players.

2 A different format for the bench test should be developed. Simple physical tests (the action-motion tests) are presently used in the classification of CP swimmers and equestrian athletes and could successfully be used in the classification of CP swimmers and equestrian CP athletes and consist of normal functional upper limb movements.

3 The new format of bench testing could be suggested to the International Wheelchair Rugby Federation Classification Panel for possible inclusion in the classification manual.

5.3 LIMITATIONS OF THE STUDY

It is acknowledged that a number of factors that could have had an impact on the experience of the participants were not directly elicited during the process of the NGT, for example underlying attitudes and perceptions.

Other limitations of this study could mainly be attributed to the use of the NGT and could be:

- As identified by Jones (2004; 24), idea generation was limited to the meeting itself, meaning that participants were not granted an opportunity to think about the question in depth and could not generate additional responses in their own time.
- The highly structured process of the NGT prevented the researcher from acting as a facilitator. Certain issues could therefore not be clarified or verified.
- The time limits with regard to serial discussion limited the extent to which participants could clarify and elaborate on their related experiences.
- The possibility exists that participants may not have expressed their experience in depth due to discomfort with the formal group process.
- The lack of anonymity may have limited participant's willingness to express their views.
- Some of the participants may have been limited by their ability to express their thoughts in writing and/or verbally, particularly when expressing themselves in a second language.

5.4 Value of the study

Despite the above mentioned limitations the value of this study lies in the fact that the need for a new approach to the bench test for CP rugby players was identified. The hypothesis is that this new approach could enhance the game of wheelchair rugby in training, game planning, team tactics, and strategies in the preparation for tournaments. It will, therefore, ultimately enhance the quality of the wheelchair rugby game as the players would be classified in their correct classes. It will also benefit the CP wheelchair rugby player by preventing unfair and unrealistic demands made on them as players in the team.

5.5 IN CLOSING

In this final chapter, the researcher attempted to suggest a meaningful solution to the problem set out in the research question outcomes. The findings of the research question were presented, conclusions were discussed and recommendations flowing from this study was made with acknowledgement of the limitations of the study.

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SUMMARY

The purpose of this study was to explore and describe the experience of wheelchair rugby field specialists regarding the use of the International Wheelchair Rugby Federation classification bench test to classify cerebral palsy (CP) wheelchair rugby players.

The researcher made use of an explorative descriptive research design. Data was gathered by the use of the Nominal Group Technique. Participants in the nominal group were field specialists in wheelchair rugby classification gathered at the Brazil International Wheelchair Amputee Sport championships. A total number of seven specialists participated in the study.

The findings of the study and the conclusions reached indicated that there is a definite need for a different and more functional approach to bench testing CP wheelchair rugby players. The participants agreed that:

- The quality of movement is not tested with the existing bench test.
- The current classifying system lacks relevance regarding the CP wheelchair players.
- The function of the CP wheelchair players is not tested at present.
- There is a concern regarding the safety of the CP wheelchair rugby players.
- The new classifying system needs to be relevant to wheelchair rugby as a whole.

Based on the above, comments were made. Firstly, a need for a different bench test approach is needed. Secondly, a different format of the bench test should be developed. This format can then be suggested to the International Wheelchair Rugby Federation for possible inclusion in the classification manual. It will, therefore, ultimately enhance the quality of the wheelchair rugby game as the players would be classified in their correct classes.

The Nominal Group Technique was found to be a participant friendly technique, inexpensive in time and effective in strategizing a solution to the problem researched in this study.

OPSOMMING

Die doel van hierdie studie was om die bestaande klassifikasiemetode van die International Wheelchair Rugby Federation te ondersoek en te beskryf. Spesialiste op die gebied van rolstoel rugby is gevra om hul ervaring in die gebruik van die spiersterktetoets (bench test) vir serebraal gestremde persone te deel.

Daar is van ’n verkennende beskrywende navorsingsontwerp gebruik gemaak. Data is deur middel van die nominale groeptegniek ingesamel. Die deelnemers aan die studie was spesialiste in rolstoel rugby en het in Brasilië tydens die 2005 International Wheelchair Amputee Sport Championships bymekaar gekom. Sewe internasionale spesialiste het aan die onderhoud deelgeneem.

Die resultate van die studie het aangedui dat ‘n defnitiewe behoefte vir ‘n nuwe, meer funksionele benadering tot die spiersterktetoets (bench test) vir serebraal gestremde rolstoel rugby spelers bestaan. Die deelnemers het saamgestem dat:

- Die kwaliteit van beweging nie deur die bestaande spiersterktetoets ge-evalueer word nie.
- Die klassifikasie sisteem nie vir serebraal gestremde spelers toepaslik is nie.
- Die funksie van die serebraal gestremde spelers nie tans getoets word nie.
- Daar besorgdheid bestaan oor die veiligheid van serebraal gestremde rugby spelers.
- Die nuwe klassifikasiesisteem relevant vir rolstoel rugby in geheel moet wees.

Die bevindinge van die studie het getoon dat daar eerstens ‘n ander benadering tot die spiersterktetoets (bench test) nodig is. Tweedens moet ‘n ander formaat vir die spiersterktetoets ontwikkel word. Dit kan dan aan die International Wheelchair Rugby Federation vir oorweging en moontlike insluiting in die klassifikasie handleiding voorgelê word. Indien dit sou gebeur, sal dit die kwaliteit van rolstoel rugby verhoog aangesien die spelers nou korrek geklassifiseer sal word.

Die nominale groeptegniek is as verbuikersvriendelik gevind. Dit is tydsbesparend en strategies effektief in die oplossing van die navorsingsprobleem in hierdie studie.

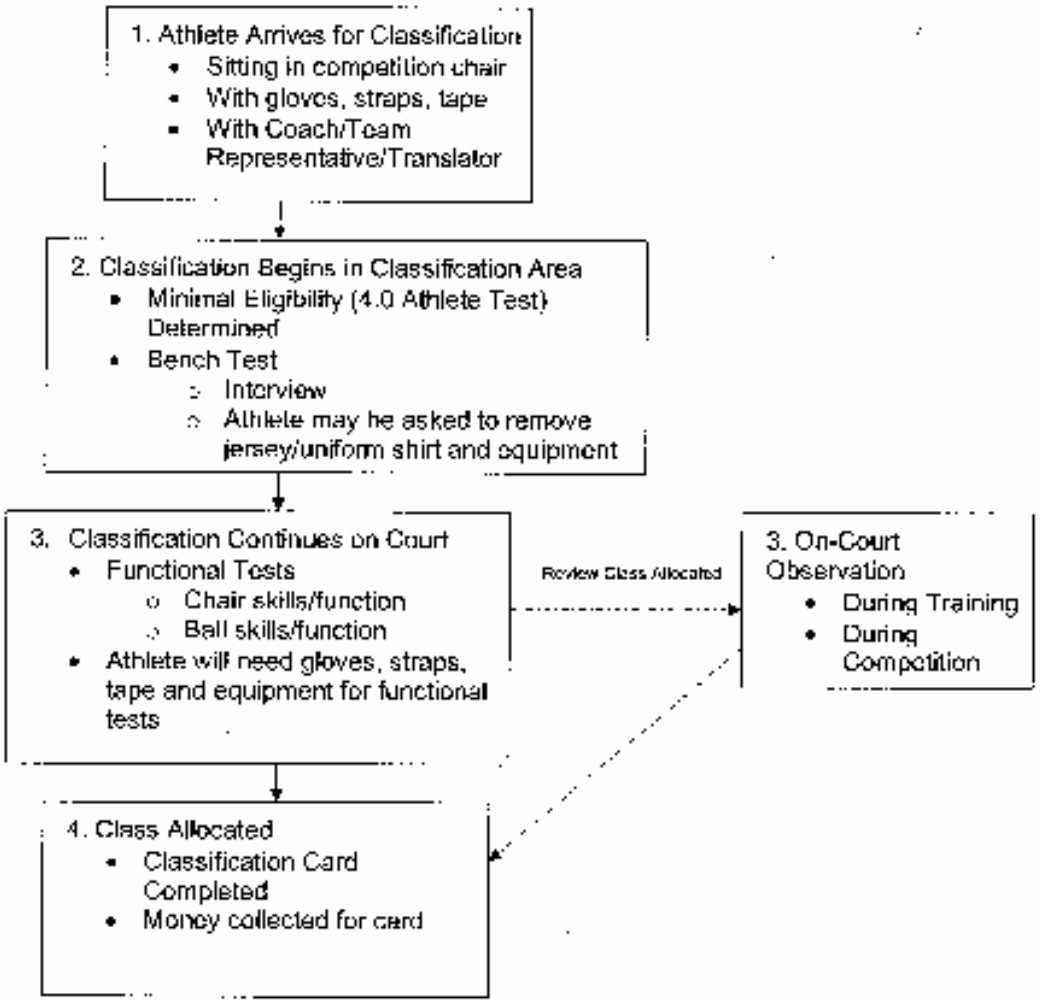
APPENDICES

APPENDIX A

(IWRF) CLASSIFICATION PROCESS

APPENDIX E ALLOCATION OF WHEELCHAIR RUGBY SPORT CLASS

Figure 2 Allocation of Wheelchair Rugby Sport Class Flow Sheet



APPENDIX B

DEFINITION OF UPPER EXTREMITY POINT VALUES

0.5 points		***1 point***	
Lats	*0-1*	*Lats*	*0-3*
Clavical pec	*0-5*	*Clavical pes*	*5*
Sternal pec	*0-1*	*Sternal pec*	*2-3*
Biceps	*0-5*	*Biceps*	*5*
Triceps	*0-1*	*Triceps*	*0-3*
Wrist extension	*0-5*	*Wrist extension*	*0-5*
Wrist flexion	*0-1*	*Wrist flexion*	*0-3*
Remaining hand	*0*	*Remaining hand*	*0-1*

2 point		***3point***	
Shoulder girdle muscles	*5*	*Shoulder girdle*	*5*
Biceps	*5*	*Biceps*	*5*
Triceps	*4-5*	*Triceps*	*5*
Wrist flexion	*4-5*	*Wrist flexion*	*-5*
Wrist extension	*4-5*	*Wrist extension*	*5*
Finger flexion and extension	*0-2*	*Finger/flexion/extention*	*3-5*
Finger abd and adduction	*0-2*	*Finger abd and adduction*	*0-4*
Thumb movement	*0-2*	*Thumb movement*	*3-4*
		A 3 point hand has functional Grasp and release.	

A muscle test of both hands and arms reflecting strengths of 4-5 in all muscle groups would reflect ineligibility for wheelchair rugby.

APPENDIX C

FUNCTIONAL PROFILES

0.5 POINT

Unopposed biceps push with abduction arid IR at shoulder

Forward head with bob when pushing

Uses back 1/4 of wheel to stop, start and turn

Utilizes forearm to stop, start and turn

Volleyball and/or scoop pass

Traps direct passes on lap or bats it in from limited range

1.0 POINT

Multidirectional start, stop and turn

Triceps push with longer contact on wheel

Uses spoke guard to start, stop and turn with wrist ext.

Arms adducted secondary to balanced proximal strength

Forearm or fist catch and weak chest pass

1.5 POINT

Usually has balanced proximal shoulder strength

With triceps 4- 5

May have unbalanced wrists I.e. wrist ext. 4-5, wrist flex. 0-3

Asymmetry is present

Consider quality of movement and fatigue

2.0 POINT

Rims the ball using wrist flexion

Effective chest pass

Balanced/functional wrist flexion and extension

Control and distance in overhead pass is limited

3.0 POINT

Uses wrist/finger flexion in flip pass & rimming the ball

Stabilizes with the opposite arm to allow greater reach

Multiple dribble one handed with control

Grip wheelchair rim increasing pushing speed

Functional finger flex and ext. for ball control in varying planes

APPENDIX D

WHEELCHAIR RUGBY SOUTH AFRICA

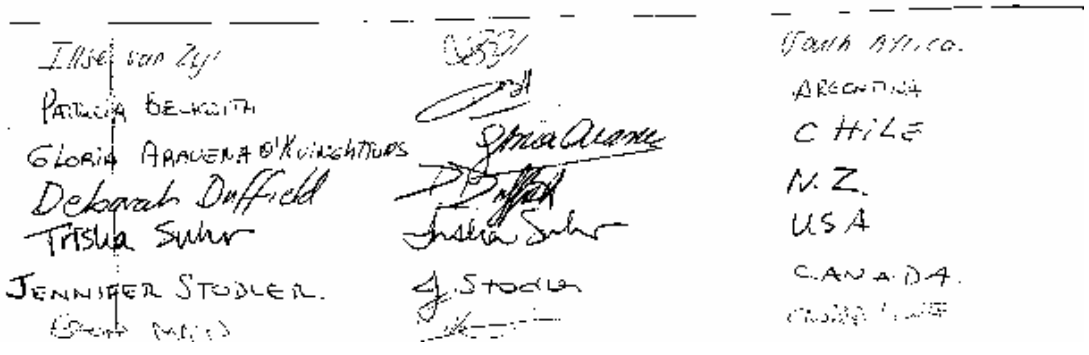
LETTER OF CONSENT

I hereby certify,(full names and surname).....

....., that I am voluntarily participating in the above-mentioned study.

The aim and procedure of the study have been explained to me and I understand the procedure. I understand that participation in the study could be suspended at any time and that all information obtained from the study will be treated confidentially.

I hereby consent to the publication of any information obtained during the study.



APPENDIX E

BENCH TEST

Name: **Date:**

Manual muscle test (0 – 5 scale)

	Right	Left
Deltoid		
Pectoralis sternal / clavicular		
Latissimus		
Serratus		
External rotation		
Biceps		
Triceps		
Wrist extension radial / ulnar		
Radial deviation		
Ulnar deviation		
Interosseii		
Finger extension		
Finger flexion		
Wrist flexion		
Thumb abduction		
Thumb adduction		
Thumb extension		
Thumb flexion		
Thumb opposition		
UE TOTAL		

FUNCTIONAL TRUNK TEST

Palpation of abdominals upper lower

Palpation of spinal extensors

Sitting balance present normal good fair poor none

TRUNK TOTAL: _____

CLASSIFICATION SCORE:

Right UE + left UE = /2 = + trunk = CLASS

The sum of the average of the right arm plus left arm divided by 2 plus the trunk will give the classification point