

## A Multidisciplinary Approach to Aquatic Programmes for Children with Physical Disabilities.

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'For children it is a movement world'. This axiom applies particularly to the disabled and at Glen Waverly Special School in Melbourne, Victoria, this self evident truth is being developed to its fullest extent. Many children with physical disabilities maintain intellectual function whilst having to contend with failing or static physical development. This juxtaposition can be both emotionally and socially devastating not only for the wellbeing of the child, but also the child's parents and extended family.

Our programmes cater for 160 children and young adults who display a wide range of physical disabilities. These include Cerebral Palsy, Spina Bifida, Osteogenesis Imperfecta, Post Accident injuries and severe degenerative conditions.

We have developed a multidisciplinary approach which emphasises interdisciplinary communication. This is a recognition by all team members that the child's programme must not be looked upon as a number of singular, unrelated entities and that a programme which is structured to meet the physical, emotional, intellectual and social needs of the child is of greatest benefit to the child and family.

The importance of incorporating therapeutic aims within a functional setting is well recognized by our therapists. This enables learning to occur and become automatic. This encourages therapists to work within the classroom. The physical education setting, be it on land or in the water, presents an ideal opportunity for mastery of certain skills to take place. Water programmes provide optimal opportunity for our children to achieve independent movement control.

Team members involved in the delivery of these sessions include:

1. Physiotherapist;
2. Occupational Therapist;
3. Physical Educator;
4. Speech Pathologist;
5. Parents;
6. Volunteers.

It is recognized that each team member does possess specialized skills which they are able to contribute to the session. For example the physiotherapist oversees the quality of the therapeutic input, the occupational therapist concentrates on activities of daily living, both prior to and immediately after the water session. Language and orofacial considerations are the special interests of the speech pathologist. The physical educator contributes to objectivity and social interaction.

Parents when working with their own children are both able to contribute to and observe their child's progress, so gaining a great deal of satisfaction from their child's achievements. Similar satisfaction is expressed from working with other

groups. Volunteers bring viability to the programme by allowing us to offer a 1:1 ratio. We also see their presence as contributing to community awareness.

After each session all team members are encouraged to participate in an evaluation of the performance of their swimmer and the future directions of the programme.

The ability to handle the disabled child in the water is of critical importance for the success of the programme and it is to this end that we conduct regular inservice education where a fundamental understanding of the conditions, their resulting effect on body shape and density, and the implications for body control in the water are taught. This knowledge is absolutely essential for planning effective programmes.

To best illustrate the comprehensive nature of our programme we have chosen to look at one specific group which caters for children with varying degrees of athetosis.

It is important to note that whereas our groups are matched according to their ability in the water the special features of the athetoid often sees these children grouped together for periods of time in order to best cater for their needs.

The difficulties of the athetoid in water are particularly taxing. In order to understand this a little better let us examine the condition more closely.

Athetosis is characterized by fluctuating postural tone. The changes are sudden, jerky and unpredictable with regard to when and where. It may change from hypotonic to normal, or from hypo to hypertonicity. It is rare for us to see a pure athetoid and more likely that there will be some evidence of spasticity.

Spasticity occurs in typical patterns and the distribution of this hypertonus will change in different positions. The degree and strength of hypertonus may change with stimulation.

All four limbs plus orofacial control, will be involved.

Speech may be absent or difficult to understand, hence communication will be difficult.

These children will lack the ability to maintain antigravity postures e.g. sitting, standing and a lack of co-contraction prevents proximal stabilization for movement of distal parts e.g. head and hands.

The child will often use total patterns of movement in an attempt to stabilize himself. However, this is ineffective for functional activity which requires a combination of flexion and extension. There will be mal-alignment of head, trunk and limbs.

The body will be asymmetrical. When movement is attempted there will be faulty grading of the antagonists particularly in middle range. Total and sudden collapse of lengthening groups can result. Repeated effort and failure may result in frustration and passive behaviour.

Righting, equilibrium and protective reactions may be absent or ineffective due to fluctuating postural tone.

It is important to remember that the athetoid is frequently very intelligent, although intellectual disability may occur. Compounding the problems already outlined, there may also be difficulties with motor planning, perception, vision and hearing, and speech and language.

In summary, the child with athetosis is able and often knows how to move, however, there is just too much movement occurring in an uncontrolled and disorganized manner.

The aims of a treatment programme can be summarized by the following points and some of the natural benefits of a water medium immediately recognized.

1. Normalize tone - it is well recognized that tone will reduce after a short period of immersion.
2. Give a point of self fixation or co-contraction. It is stated that the human body will not make a controlled movement unless from a position of stability.
3. Grade movement.
4. Encourage normal righting, protective, and equilibrium reactions. Water is a supportive medium which allows the swimmer additional time to react.

A number of our ability matched groups cater for children who display varying degrees of athetosis. These children have difficulty in mastering the effects of gravity and when introducing them to a water medium we are largely eliminating the effects of gravity and introducing an opposing force, that of buoyancy or upthrust. Effective programmes have been developed from the guidelines of the work that has been done by Mr. James McMillan using the Ten Point Plan of the Halliwick Method.

The general pool environment is particularly critical for the child with athetosis. A relaxed and calm environment is conducive to controlled movement. Our pool is in a secluded area of the school where we discourage interruptions, excessive noise, and/or movement on the poolside. A startle response can often be elicited in the child with athetosis. Therefore, it is necessary for the group leader to foster a calm and controlled environment which in turn should flow through to the change rooms.

Initially we will be working toward the development of a balanced position in a vertical plane.

Stability in any position will be difficult because of the constant change in body shape caused by the involuntary movement. This involuntary movement will increase with fear, anxiety, and effort. Correct handling and support will minimize this.

The 'damping down' effect of water on the involuntary movement of the athetoid aids to achieve stability. By using the weight of the water, this impedance helps dampen down excess movement so that the child may experience lying still or 'balance is stillness'. It is essential that as much of the body as possible is kept in the water to achieve the benefits of the medium. The swimmer needs plenty of time to experience stillness and should be given repeated opportunity to practice.

Involuntary movement can create turbulence for the child with athetosis further increasing their difficulties in achieving stability. This phenomenon of moving water must be kept to a minimum and instructors must be aware of any additional turbulence created by either the instructor or other pool users. As confidence with stability is achieved this phenomenon should be used to further develop stability. Isolated turbulence may

be applied to induce a specific movement or muscle reaction. With the constant alteration in body shape the teaching of lateral rotation is extremely important. This will allow the child to gain stability around the longitudinal axis. Natural rotation will occur along this axis in the athetoid due to the asymmetry and short radius. This movement in the athetoid will be rapid and unpredictable. Increasing the radius initially, will slow the movement that is occurring, and allow the child a longer period of time to adjust. Initially lateral rotation will involve activities in a vertical plane before progressing to a horizontal position.

Vertical rotation will ultimately include movement through a full 360 degrees. As with lateral rotation initially it is important to gain control over a small range either side of a stable position. Again activities will be in a vertical position.

Many of our swimmers have difficulty bringing themselves from lying to standing. A combination of a low floating position, incoordination with breath control, and the control that is necessary over upper and lower limbs contribute to this. Once this movement has been mastered the swimmer will be more confident about lying back. They know they can achieve an upright posture and safe breathing position.

It has been our experience that the child can often achieve the vertical position and then fix at the rail where they have not fully mastered a free standing/sitting position.

With a number of our athetoids, contact with the bottom of the pool has encouraged an extensor thrust which has then caused a backward movement or rotation.

Depth of the water is critical in this situation, however, with a number of our older children we have been unable to accommodate them optimally due to the limitations imposed upon us by the poor design and construction of our pool.

With inadequate depth and extended legs, not only is it difficult to get the mouth to the water, but our swimmer is also very difficult for the instructor to control.

In water we are able to observe the remarkable reactions which occur as a result of small changes in symmetry and body shape. By learning how to manipulate and control these reactions the child is able to develop effective propulsion and mastery of both vertical and lateral rotation. This may be achieved as a result of a slight movement which would not have brought about a change in body position on land. This is an unbelievable motivator for our children who find controlled movement on land so difficult or even impossible. We are continually amazed by the achievement and motivation of our children and believe that if given the opportunity in an appropriate environment that a large degree of independent movement control is obtainable.

This brings me to the important point of disengagement. When working with the child with athetosis this is not easy for the instructor and will largely depend upon her/his competence and confidence. However, it is imperative for the instructor to be able to both disengage and re-engage correctly and at the appropriate time for the child to achieve his or her full potential.

Symmetry should be encouraged at all times until the effects of lateral rotation are being introduced.

Providing water is at a level higher than T11 or tip of sternum, vertical body control will be entirely dependent on the position of the head. Head control is not fully developed in these children and a water medium provides an effective means of facilitating this control.

Breathing in the athetoid is short, shallow and erratic along with the fluctuating tone and inco-ordination of diaphragm, intercostals and orofacial muscles.

Blowing is an essential part of an aquatics programme. On land the body is at atmospheric pressure. However, in the water we are working with negative pressure breathing. Blowing will also prevent the swimmer from holding their breath and causing increased tension throughout the body.

For the athetoid blowing is an extremely difficult activity. The mouth is often open, the jaw may be hypermobile and lock open particularly on effort.

Surprising results have been attained with improved mouth closure and breath control which will carry over to land activities, particularly in reference to the problem of drooling frequently present in the athetoid and the poor vital capacity which contributes to frequent chest infections.

The child with athetosis may have poorly developed head control and the fear associated with this may inhibit the child from putting his/her face near the water in an attempt to blow. By allowing the child to fix with both hands on the rail we are providing some added stability which will assist the child in grading head movement. In the early stages it may be helpful to aid in the fixation of the hands if the child is unable to maintain their own bilateral grasp.

Instructors should be aware that these children do take a long time to learn, partly because of the restricted time given to them to practise.

The group situation acts as a motivator by allowing the swimmers to see the progress of their peers. The social interaction provided by games and activities is an important aspect of our water programmes. The disabled child is no longer set apart.

Innumerable ways to work on a specific aspect of the ten point plan give the child repeated opportunity to practise and develop skills over a long period of time.

Once the child is familiar with rotations which may occur around either axis, they may be introduced to turbulent gliding. This gives the swimmer a true experience in moving water. It will then naturally lead on to a suitable stroking method.

Any available movement requires careful analysis so that the swimmer may maintain a balanced position while propelling themselves through the water. Appropriate stroking for the athetoid will generally commence as controlled bilateral stroking in a supine position. This minimizes the additional problems of breath control and the bilateral movement will also reduce any lateral instability. In many cases movement for propulsion will be initially ineffective. Turbulence can be used to overcome initial inertia thereby giving the child

the opportunity to achieve effective propulsion.

It has been our experience that initially leg movement will introduce a gross movement from the hip which causes alteration in body alignment on the surface of the water. However, where there is no possibility of developing propulsion with the arms this gross movement must be refined and utilized in a manner where body alignment can be maintained.

Further stroke development should occur where it is appropriate according to the child's developing potential. We must not place limits on our swimmers as they do continue to develop if given the opportunities to do so.

The child regardless of the severity of physical disability should be directed towards programmes which have been tailored in such a way as to allow him to work to the limits of intellectual and physical potential.

Only with appropriate realistic challenges will the child achieve the necessary self esteem which will allow him to enjoy life and see himself as a worthwhile individual.