

Teaching physical education and prescribing exercise in a structured setting and communicative context: focus on social integration

Marialice de Castro Vatauvuk

There is a great deal of concern in the field regarding the lack of data based research involving people with autism and the motor domain as well as a general claim that physical educators have generally had little to say in regard to program suggestions, teaching principles or motor performance with autism and furthermore have been conspicuously silent concerning the role of movement activities for this "population" (Crowe, Auxter & Pyfer, 1981; Reid & Morin, 1981; Seaman & DePauw, 1982; Reid, Collier & Morin, 1983, Morin & Reid, 1985, Collier & Reid, 1987).

Whoever dares to dive in a deep search for the genesis of autism would take the risk to be brought back to the primordium of mankind. Together with time in the human phylogeny and at an astonishing speed, runs a crescent demand for very specialised adaptational abilities and skills whose proficiency are fundamental for survival as a free representative of the human specimen.

It is now 53 years since Leo Kanner in Baltimore published his first paper with the original description of autism, and during this half of century we've been witnessing researchers and professionals of several fields struggling in the endeavour to grasp the very nature of autism, specially an almost desperate search for common markers. It seems nowadays that the more we try to "round off" the circle, overly broader turns out to be the syndrome of autism. Under the wings of pervasive developmental disorders (Volkmar e cols. 1994) with trends to be viewed as a non-specific behaviour syndrome shading into other disorders of empathy (Gillberg, 1992), the "autistic continuum" (Wing, 1989) or "autism spectrum" (Gillberg & Gillberg, 1989) involves three classes of affected areas, often referred to as a triad (Wing, 1981 a, Wing & Gould, 1979) of social, communication and behavioural impairments. To be more specific, the "common markers" at this time is that there must be severe impairments in: 1) relating reciprocally to other people, 2) verbal and/or non-verbal communication, communication, and 3) in adjusting the behavioural repertoire in a flexible way to the changing demands of new social situations (Gillberg, 1993).

Therefore, the diagnosis *per se* involves not only non-specification but also does not provide conditions for the establishment of prognosis and adequate treatment strategies (Assumpção Jr., 1995). However, comprehensive educational interventions at early age, remain the best documented approaches in the treatment of autism (Howlin & Rutter, 1987; Shopler, 1989; Lovaas *et al.* 1989; Howlin & Yates, 1989).

SUMMARY

The main purpose of this presentation is to pinpoint some principles and practical considerations concerning the development and implementation of physical education and exercise programs for persons with autism, stressing the possibilities of social use of the abilities fostered, thus enhancing quality of life. Firstly, is essential to know how is each student individually in the general context of autism. According to our experience, the first two steps for the development of meaningful, good motor skills is to know in details the actual motor skills, interests and communicative skills, to ensure, the person will be almost absolutely successful in the tasks posed to build-up motivation, compliance, self-esteem and independent performance. Secondly, for "having fun", easily understanding of what is expected is crucial. Structural elements play an important role in this game. The teachers have to be good players maintaining a positive relationship with each student, students in couple, the group, the students and non-handicapped peers, brothers, sisters and the parents. Thirdly, we recommend activities compatible with the culture of each specific community, in our case São Paulo – Brasil, to facilitate integration. Our institution opted for jogging, indoors and outdoors circuit training, skating, swimming, gym, imitation games, relaxation, massage and the use of music. Last but not least, frequency, duration, intensity and medication must be taken into account.

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In our institution, a division of AMA—Association of Friends of People with Autism in São Paulo, Brasil, after years of search for a treatment approach that would be flexible enough to meet this population and their families, we adopted a great deal of the philosophy and principles of TEACCH approach (Rutter, 1978; Schopler *et al.*; 1980, 1984, TEACCH, 1991), of course with far less complex administrative structures.

It is of great weight to bear in mind that those principles have to be constantly re-examined in the light of current developments, the enduring cardinal ones are:

1. the view of autism as an organic disability: that they process information and understand the world quite differently than their non-handicapped peers; the main goal is the understanding the implications of their central impairments, thus to use this in bridging the gap between their perception and those shared by the rest of society;
2. parents-professional collaboration: this interaction is not only politically potent but crucial for assuring the valid programs for each individual child;
3. people with autism and their families require a “continuum” of lifelong comprehensive services based on the demands of each particular community;
4. individualization: is the key to establish specific strategies for individual skills, strengths, interests and the single needs of the individual and the family;
5. an interactional model: where the optimisation of the treatment will depend on: the interactions (a two-way view) between parents and professionals, parents / professional and the individual with autism, and the evaluation of the educational / therapeutic intervention will be based on A x B, which A is for the person with autism – the best combinations to enhance his/her abilities and consequently promote adaptation and minimise behavioural problems- and B. from the environment – the adaptations applied at school, home and community in acceptance and recognition to individual's special needs to promote integration (which cannot be taken at all as normalization);
6. a generalist model, instead of too much concentration on a single aspect of the child or narrowly to the eyes of an specific discipline, it requires a broad view of autism, of the needs of the person and the family focusing on organizing information and treatment prescription on those central priorities.

Coming back to the first issue posed: Are problems in the motor domain central in autism?; What information do we have concerning the motor performance of people with autism?; Would specific knowledge and concentration in the motor domain enough for developing meaningful physical education and exercise programs? and What could be the role of movement activities for people with autism?

In his classical paper Kanner (1943) commented that motor development and co-ordination were normal in autism, that although clumsiness in gait and in gross motor performances, they were very stillfull. This clinical observation remained for more than thirty years, when researchers began to question the belief of adequacy and developmental consistency with chronological age (Lotter, 1966, Wing, 1976, Ornitz *et al.* 1977; Geddes, 1977). More systematic and/or specific studies or motor performance of people with autism (De Myer, 1976, 1980; Singleton, 1974; Jones & Prior, 1985; Maurer & Damasio, 1982; Reid, Collier & Morin, 1983; Morin & Reid, 1985), come to “disappointing” results: when compared to retarded and non-retarded, subjects with autism revealed poorer scores on the following fitness measures: body fat, grip-strength, abdominal strength and flexibility, specially in trunk flexion. They were below chronological age level on tasks requiring physical integration skills, quite below the level of normal and subnormal children on body imitation tasks (dynamic and static movements), on qualitative motor skill performances: immature motor patterns in throwing, jumping and running, accompanied by inappropriate and non-functional arm movements. The subjects with autism, despite demonstrating significantly superior performance qualitatively on dynamic balance, virtually moved at a slower and more controlled speed. Minimal differences in performance on most tasks were found when comparing older and younger groups of autistic individuals. It was also found splinter skills, diminished energy output, low functioning, regarding body image, abnormalities on postural fixation and righting, bradycinesia, akinesia, dystonia, hypertonia and hypotonia. Some of the researchers tend to attribute this low scores to autism in association to mental retardation (75% to 90%). On the other hand, others found that there are difficulties with complex co-ordinated motor tasks even in the high functioning seeming to indicate central nervous system dysfunction. In one of the studies that compared the performance of high, middle and low functioning people with autism to people with mild retardation, people with autism had lower scores except for stair tasks (climbing and descending). Anedoctically in this task, the middle functioning had the best performance of all for groups. According to some of the authors, from a developmental

perspective the formula “normal development in slow motion” does not apply, they progress at different rates and some motor behaviours are atypical at any stage of normal development. Reid (1981) suggested that “motor impairment might be a misnomer for what is really poor perceptual processing”.

After this brief review of some research data on the motor domain of people with autism, it is not unkind to come to the conclusion that the striking problems posed are mostly manifestations of the central deficits in autism and that individualization is the key for enhancement. In our opinion programs of physical education and exercise, must not concentrate on teaching movements as an end in itself, but on the usefulness of its learning stressing the possibilities of gains in adaptation, social use of the abilities fostered and the enhancement of quality of life (Haracopos, 1989). Without taking into account the context, in other words, the particular needs of each individual for more independent life in his/her community, it turns out to be an empty conception, which would be transformed in one more source of displeasure in the life of people with autism.

The first step is to know how is each person individually in the general context of autism, and the intricate, creative interaction between autistic traits and other qualities of the individual, in this way: no two people with autism are the same (Sacks, 1994). According to our experience for developing meaningful, good motor skills, it is crucial to know in details the actual motor skills, cognitive style, interests and communicate skills of each student. To tackle this issue we suggest the use of data from some instruments: careful analysis during the application or of the results in the CARS (Schopler *et al*, 1988) items: relating to people, imitation, emotional response, body use, object use, adaptation to change, visual response, listening response, use of the proximal senses, fear and nervousness, the PEP-R (Schopler *et al*, 1990) or AAPEP (Mesibov *et al*, 1987) for specific information concerning the development in different functional areas as well as behavioural characteristics, an evaluation of spontaneous communication skills in every day life (Lord *et al*, 1989).

It is indispensable to talk to the family for assessment of person's interests and experiences in leisure time, expectations and concerns of the family about motor/leisure activities they would like to share with. Not less important is involving the whole family since the beginning as well as thinking together in activities would be compatible with the culture and the community in question.

For scanning the actual motor skills, cognitive style and level of confidence in solving motor problems, structural level needed for self-orientation, attention

span without much help of the instructor, level of “concrete thinking”, motivators and direct interests, is very useful to apply some sessions of informal evaluation in the settings where the activities will be applied, in our case indoors and outdoors. Situations are purposefully created, with basis on the previous information gathered:

- a) in form of circuits of obstacle courses, which beginning and ending are clearly indicated, where are posed some “real” problems and “tricks”, and may demand: changes of direction and plains, climbing, descending, balance, jumping, hanging, straddle, transporting objects, static and dynamic balance, ball kicking, shooting, throwing etc.
- b) the same situation together with his/her group (ex. in a row);
- c) more free situations, with some hints displayed by the disposition of materials, with the teacher, for specific skills ex. imitation (dynamic and static), ballplaying (rolling, kicking, dribbling, catching);
- d) others situations demanding proximity and/or co-operation, with the teacher or peer(s);
- e) physical evaluation: height, weight, skinfolds (if possible in this initial contact), heart rate and blood pressure at rest, during and after exercising.

During this situations the teacher has to be concentrated on observing:

1. how the student solve the problems, explore the environment;
2. which resources he/she relied on doing so: motor feedback (proprioception), visual input, others;
3. what type of hints from the environment and teacher were more relevant;
4. if the student “asked” for help somehow and how the student communicate (functions and semantic categories used);
5. which motor abilities are good, emerging or poor;
6. was he/she capable of modulating rhythm accordingly;
7. his/her resistance to frustration;
8. what was the level or style of interactions established between teacher, student and peer(s);
9. if the student demonstrated any kind of interest or pleasure during this sessions;
10. which type of stimulus distracted (or tended to) and attracted by the student;

11. was the student motivated by social praise (understood by any verbal or non-verbal modes of communication displayed by the teacher to praise the student).

The acquisition of a motor ability involves a teaching-learning process, the main goal is the solution of a posed motor proposition which is demanded by the external environment (Tani, 1989). To find a "solution", the individual must to process the information gathered from the external environment and of his/her own body (proprioceptive) and make the necessary adjustments. It involves a vast array of very sophisticated interactions between the sensory receptors, perception mechanisms, feedback circuits, muscular system besides motivational factors. It has a direct relationship to attention, integration and processing of information, sequencing and memory. Optimal gains in performance are obtained if the solution of the motor proposition once obtained is repeated for retention. In this process, performance errors can be originated by three axis: 1. the individual that transmits the information, 2. the environment and 3. the person which receives, process and apply the information for solving the problem. In autism, together with the Triad of impairments, independently of IQ, we have cognitive, sensory, organizational impairments as well as markedly uneven development between and within the various developmental, functional areas.

Thus, we have actually a problem with "axis 3" and have made all the screening to obtain a "profile". In this way, the system for adequate learning acquisition is disbalanced, or out of modulation. As a result the next step is to make trials to adjust axis 1 and 2, respectively. It demands for creativity of the teacher to make constant environmental manipulations, select flexible strategies and activities' organization. On top of this, if axis 3 changes its position, in other words students gain adaptation, axis 1 and 2 have to bring up date their acquisition. Thus, there is no place for "inactivity".

If people with autism lack a Theory of Mind (Leslie 1987, 1988; Frith, 1989), a challenging start is to exercise our innate capacity of stepping in other people's shoes, and the striking enigma to decipher would be the boundaries between lack of empathy and capacity of linkage or attachment. The teacher shall be someone who shares his/her experiences with the students, not being a good person, but a gentle one; a facilitator adjusting his communication to each particular situation, being economical and concrete when using verbal language, giving priority to the modes of communication used by each student: instrumental gestures, corporal posture, facial expression...

Instruction will involve the use of a varied of prompts and cues in combination:

a) complete/partial physical manipulation, manipulative prompting, minimal guidance; b) complete/partial skill model or demonstration; c) gestural cues; d) direct instructions or cues; e) indirect cues or f) no cues or prompts: imitative initiation and/or spontaneous initiation. In some situations where demonstration and imitation are used, some "acting spirit" and concrete miming can help to stress clear-cut definitions of main position(s) and movements and their nature (slight or powerful). Sounds can be smartly used to hint the target goals: claps, counting, cueing by reproducing the sound of a ball dribbling, the landing of a platform etc.

The teacher and instructors have to be good players, building up in class a positive relationship with each student, students in couple, the group, the students and non-handicapped peers, brothers, sisters, parents and sympathizers. In our institution, a great deal of students benefit from sessions with brothers or sisters, non-handicapped peers, other members of the staff, relatives and parents. We observed surprising gains in performance during this sessions. Before participating all have to know the rules for "getting the neck of the game". Axis 2, the structural elements of the environment, play its role by offering redundancy of relevant information. For having fun, easily understanding of what is expected of him/her is crucial. The main elements are: visual "division" of the space in areas, physical disposition of materials, class schedules, sequencies and routines, visual organization and hints, individualized tasks structures and communicative systems.

Some ideas from an ecological framework are of great value in engineering the environment and structuring the tasks. It emphasizes the person-environment relationship. According to Gibson (1977, 1979) the environment is perceived in terms of its utility for the perceiver. Following the same view, other authors suppose that movement co-ordination and control emerge from the mutual constraint of perception and action (Fitch, Tuller & Turugy, 1982). If we are dealing with people that need central coherence, who have difficulty in making sense out of the world (Frith, 1989), irrelevant objects that are able to be acted upon should be removed, while objects used in a given task should be modified to accentuate or increase their attraction to be acted upon (Burton, 1987). By our side, we have the concrete nature of movement, which provides an immediate indication of success or failure (Mosher, 1981). The flexibility of motor tasks, organized in chains, not sprayed or dispersed in the space, enables the teacher to set the goals making adjustments, even

during its course, to give immediate feed-back and assure, specially in the beginning, that the person will be almost absolutely successful.

The repeated experience is successful accomplishing a task provides not only an intrinsic reward, but also opportunity for the teacher to respond with approval to the student actions. The maintenance of motivation and compliance are positively related to success (O'Dell, Dunlap & Koegel, 1983) and are essential to build up self-esteem and for independent performance. In other studies, some authors, pointed out that the evident low level of motivation in children with autism, might inhibit the acquisition of new skills and maintenance of acquired skills (Koegel & Mentis, 1985), other suggested that motivation might be decreased, performance impaired and task avoidance increased by repeated experiences of failure (Clark, Rutter, 1979; MacMillian, 1971; Rodda, 1977).

In selecting the activities we consider: adequacy to chronological age, total information from evaluations and its compatibility with cultural and familiar factors, for giving people with autism the tools they need to keep fit and enhance quality of social life. Particular needs are fully considered, one of our students is now attending a normal school where he is learning to play soccer, although being very skillful, he has some "typical autistic difficulties": in knowing what side is supposed to be attacked and thinks that no matter where the goal keeper is (for instance, behind the goal line), if he catches the ball, a goal is not obtained. The main program for him is a backing one, consisted of a series of practical motor tasks for helping him to learn the rules. We opted for walking, jogging, circuit activities, circuit training, skating, swimming, gym, imitation games, relaxation games, massage and the use of appropriate music as much as possible. To organize and present the tasks it is a mainly used a task specific approach (Auxter & Pyfer, 1985) rather than a developmental approach. It concentrates in teaching a specific skill or a chain of skills directly, in as normal context as possible and moving down to work on general abilities or basic input/output system only if it is necessary for a particular skill.

The class structure is established following the normal technical principles of physical education and training. The sequence of a basic class is: 1. warm up (articular, muscular and cardiovascular), 2. main activities (longer) and 3. cool-down (relaxation, massage, specific exercises, stretching...). The length of time of each class is two hours and the main activities, for instance, circuit and swimming, basketball and skating, are distributed to the week in a balanced form (enough exposition for learning).

The initial indispensable action in a class is to present to the students a "temporal sequence", to assure

the communication of what is going to happen, by schedules adapted to the individual needs: objectal, representational, written or in combination. In my experience, if you guarantee the communication of what is going to happen, constant changings in routine are well accepted. Depending on the group that can be done individually, in pairs or the whole group, the schedule presented ready or made by teacher and students. Schedules are a potent opportunity for teaching opportunism: to evaluate gains and introducing new challenges. For instance, give opportunity for choices or posing a sequence of activities in the main part of the class that the last of it will be done only if there would be time for (to negotiate the rigidity of a high functioning student).

There are many reasons to present tasks in form of circuits with varied goals:

1. it offers instantaneous opportunity for self-oriented performance;
2. poses a concrete situation with clear beginning and ending;
3. student may have immediate feedback on performance and opportunity to make many trials and to "solve the problem" in its own manner;
4. gives a multitude of possibilities for combination of varied categories of skills, so offering relevant and dynamic motor experiences;
5. physically or visually connecting isolated pieces of equipment increases the number of possibilities concerning spatial disposition, variation of courses, combination of emergent and mastered skills, combination of each student tastes, interests and level of abilities;
6. provide chances for both group work at many levels and individual adaptations using the same materials, posing different tasks according to individual ability.

The level of "density" of the materials and its disposition must be proportional to the symbolic and representational impairment of the person with autism: so one can use dense materials with real connection (stairs, benches, car tyres, bicycle tyres, balance beams ropes...), materials not so dense and visually connected (footprints, tracks...), graphic indications (arrows, numbers...), pictures, drawings, written hints, other particular hints directed linked to what they are learning in class etc. For developing flexibility and helping generalization the teacher has to try both, the use of same materials for different proposals and different materials for the same proposal.

Circuits can be used for teaching fundamental skills and developmental activities, for learning new skills and for training what they had already mastered. It

can be “open” (one route), in stations or continuous. Continuous circuits are closed, so the teacher must propose or establish the number of turns the students are supposed to do, and find a meaningful way to make it clear. One way to do so is having a small box for each student (with photo or name) over a table “in circuit” with a number of tickets or checkers corresponding to the number of turns. Each time the student passes the table he/she gets a checker and insert in a coin keeper, when the box is out of the checkers, game’s out. It gives chance for students asking for more checkers of giving some back to the teacher. In continuous circuits, generally more adequate for training, the measure may not be the number of turns but the length of time (use timer). Station circuits are displayed in sequential stations where the students (normally in couples) stay making the same movement or a small sequence of movements for some time or number of times. Ex., for adolescents: a. Bicycling (2 ergometric bicycles), b. infra-abdominals (specific apparatus), c. jumping (2 rebounders) and d. strength training: trunk (2 pack-decks).

For developing the initial abilities obtaining gains in performance and using meaningfully skills learned, this learning process is followed; the student needs to learn: 1. the necessary movements, 2. combine in the situation proposed, 3. repeating for retention, fixation, 4. repeating, in optimal timing for the situation, 5. repeating in optimal timing and length of time for the situation (Le Boulch, 1984). It is of great weight to apply systematic sabotage to negotiate their rigidity, to bring up date their acquisitions of adaptation, always posing new challenges, as it’s hard to foresee their limits and it should not be given chance for losing such priceless opportunities.

The selected priorities are: aerobic exercise training for adolescents/adults and functional/developmental motor activities for the younger. Studies employing a variety of antecedent exercises have documented that a wide range of clinical populations had associated reductions in negative behavioural and affective symptoms. Other studies have shown improvements in social skills through structured exercise programs even though the activity was not aerobically stressful (Elliot, Dobbin, Rose & Soper, 1994; Andel & Austin, 1984). Similar results were found in studies concerning mainly children with autism (Watters & Watters, 1980, Kern *et al.*, 1982, 1984). The single ones that used adults (n = 6) and preadolescents (n = 3), (Elliot, Dobbin, Rose & Soper, 1994; Levinson, L.J & Reid, G., 1993), suggested that vigorous aerobic exercise might be a useful tool in reducing stereotypic and maladaptive behaviour, thus facilitating community integration. Last but not least, considerations concerning training

variables and medication must be taken into account for each modality. The most obvious implication would be to become familiar with physical fitness training techniques. Since vigorous training in the aerobic modality is designed to stress the cardiovascular system to approximately 70% of the maximum function for a minimum of 15-20 minutes (Cooper, 1978), and in general the intensity ranges from 60% to 70% of maximal functional capacity (American College of Sports Medicine, 1986), it is important to have an in-depth understanding of exercise physiology, prevention and treatment of sports injuries, and emergency procedures. Periodization of training have to be planned with maximum measures for security as they can not tell what they feel: frequency, duration, intensity, graded exercise programs prescriptions, nutritional concealing, knowledge of early signs of overtraining, systematic screening and supervision. Physical exercise increases the production of norepinephrine with similar results so that of using amphetamines and there are several reports of “negative addiction to exercise” or symptoms similar to chemical dependency (Mogan, 1979b). Vigorous exercise results in increased level of plasma β -endorphin (Borttz *et al.*, 1981), according to Sahley and Panksepp (1987), this would be beneficial to reduce stereotypic behaviour in people with autism.

Research have shown that vigorous exercise may heighten the person’s sensitivity to pharmacological agents, thus supervision of specialized medical professionals is highly recommended.

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