

THE INCLUSIVENESS OF WHEELCHAIR TENNIS: A PILOT STUDY

L'INCLUSIVITÀ DEL TENNIS IN CARROZZINA: UNO STUDIO PILOTA

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Abstract

Wheelchair tennis is a Paralympic discipline very similar, from a regulatory and technical-tactical point of view, to the game of tennis, but the ball can bounce twice on the court before being hit with the racket. The regulation provides for the possibility of competing in singles and doubles competitions and tournaments with the Open categories, divided between male and female tournaments, and the Quad in which men and women can participate together. The pilot study, aimed at inclusiveness, was carried out by monitoring the performance of wheelchair tennis athletes between the ages of 14 and 16. The champion consisted of four male wheelchair tennis athletes and four partners, three males and one female. The study lasted about four months from the beginning of the 2021-2022 school year and the goal of inclusion through sport was pursued, monitoring the level of collaboration and peer tutoring within the school community. The sample carried out athletic and technical tests with shots without and with the racket, the results of which showed that, at the end of the research path, the improvements related to the coordination and conditional skills were related to the increase in accuracy in the score of about 4% for wheelchair tennis athletes and about 9% for partners with a total average of about 6-7%.

Il tennis in carrozzina è una disciplina paralimpica molto simile, dal punto di vista regolamentare e tecnico-tattico, al gioco del tennis, ma la palla può rimbalzare due volte sul campo prima di essere colpita con la racchetta. Il regolamento prevede la possibilità di disputare gare e tornei di singolare e di doppio con le categorie Open, divisa tra tornei maschili e femminili, e la *Quad* in cui uomini e donne possono partecipare insieme. Lo studio pilota, finalizzato all'inclusività, è stato effettuato monitorando le performance di atleti wheelchair tennis di età compresa tra 14 e 16 anni. Il campione era formato da quattro atleti wheelchair tennis maschi e da quattro partners, tre maschi e una femmina. Lo studio ha avuto la durata di circa quattro mesi dall'inizio dell'anno scolastico 2021-2022 ed è stato perseguito l'obiettivo inclusione attraverso lo sport, monitorando il livello di collaborazione e tutoraggio tra pari all'interno della comunità scolastica. Il campione ha effettuato test atletici e tecnici con tiri senza e con la racchetta i cui risultati hanno evidenziato che, al termine del percorso di ricerca, i miglioramenti relativi alle capacità coordinative e condizionali sono stati riferiti all'incremento della precisione nel punteggio di circa il 4% per atleti wheelchair tennis e di circa il 9% per i partner con una media totale di circa il 6-7%.

Keywords

Wheelchair tennis, inclusion, ability

Tennis in carrozina, inclusione, abilità

Introduction

Motor-sports activity is a peculiar phenomenon in the context of human activities, it represents an indispensable foundation for an adequate psycho-physical growth of all individuals and has a positive effect on quality (Anokye et al., 2021; Mazzeo et al., 2015) of life (QoL). The development of the individual, seen as a psychophysical unit, is an indivisible continuum, subjected to the rigid rules of auxological laws (Cilia et al., 1996), which concerns both intrinsic factors (genetic, ethnic, racial, endocrine) and extrinsic factors (food, environment, economy). The evolutionary scan divided into phases, closely related to each other, is aimed at an optimal structure of the body scheme, such as knowledge of the parts of the body on oneself and on others, their functions and their localization, motor patterns and , subsequently, of the development and consolidation of coordination and conditional skills as well as of the aptitude to establish emotional relationships and relationships with the surrounding environment (Montesano et al., 2019). The action of motor-sport activity is therefore to be referred to the possibility of improving the ability to adapt to a problematic situation in order to be able to integrate into the socio-cultural reality of belonging and modify it if necessary. The possibility of integration is closely related to the inclusive processes that affect our society with the increase in immigration phenomena, the expansion of multicultural communities, the evolution of mobility phenomena (Montesano et al., 2013). From this perspective, the educational and training process within the school community has assumed, over the years, dynamic connotations as a function of changed social conditions. The consequent reconfiguration of educational paths and the need to combine different needs of school-age subjects represent variables attributable to the need to create adequate learning conditions so that an inclusive school (Arcangeli et al., 2008) can promote the right that the subject is considered equal to the others but at the same time different together with the others. Inclusion (Dovigo, 2007) is the process through which the school context, but the social context in general with the participation of its various protagonists (school organization, students, teachers, families, territory), takes on the characteristics of a responsive environment to the needs of all subjects and in particular of those with special needs (disabled, SEN). The inclusive process is therefore based on a complex, systemic thought shared by all the realities that belong to the school and which contribute to the construction of synergistic and significant educational-training interventions for all students (Ianes 2005). The choice of an inclusive educational path recognizes the need for personalized interventions oriented towards diversity, identifying individual characteristics, in particular motor and sporting ones (Kudláček, 2001), and the motivations (Hutzler, Oz, Barak, 2013) to participate in a 'sport activity. The adoption of good educational-sporting practices (Pignato, Coppola, Manzo, 2016) made it possible to carry out

a pilot study based on participation in wheelchair tennis sports (Vogler et al., 2000), with four amateur athletes in wheelchair and four able-bodied partners aged between fourteen and sixteen attending Secondary Education Institutes. The purpose (Block, Zeman, 1996) of the pilot study, developed for about four months at the beginning of the 2021-2022 school year, was to promote inclusion through sport (Gottin, Degani, 2010), monitoring the level of collaboration and peer mentoring within the school community.

1. Wheelchair tennis

Wheelchair tennis is a Paralympic discipline very similar, from a regulatory and technical-tactical point of view, to the game of tennis (Alfonsi, 2010) and its discovery and diffusion dates back to the 1970s thanks to the intuition of two American disabled people, who founded the WTPA (Wheelchair Tennis Players Associations). Unlike in tennis, where there is only one bounce on the court before hitting the ball, in wheelchair tennis the ball can bounce twice on the court before being hit with the racket. It is a sport that involves the use of a wheelchair and a racket. The regulation, issued by the International Wheelchair Tennis Federation (IWTF) affiliated to the International Tennis Federation (in Italy FIT - Italian Tennis Federation), establishes the subdivision into categories, defining the type and degree of disability, and the possibility of competing in singles and doubles tournaments. Athlete's level of impairment is an important factor in mobility performance (Sindall et al., 2021) in wheelchair (Rienk et al., 2021), ergonomically improved (Mason et al., 2013) over the years, as well as classification systems that vary from one sport to another.

The Open category, in fact, provides for the division between male and female tournaments for athletes with impaired lower limbs while in the Quad category men and women, with diversified impairment of the upper limbs, can participate in the same competition. Wheelchair players with disabilities can compete against able-bodied players using the double bounce rule.

2. Materials and methods

2.1 Participants

The research was conducted with an observational method and with manual and computerized detection, from September to December 2022 on a sample of eight young athletes, four male athletes practicing wheelchair tennis at an amateur level and four able-bodied partners, three males and one female. The participants were aged between 14 and 16 years (14.75 ± 0.45) and the necessary prerequisite was the release of competitive medical-sports qualification.

2.2 Aims

The goal was to encourage inclusion and collaboration between peers through the sport of wheelchair tennis (Groot, 2015) by monitoring the improvements in coordination and conditional skills.

2.3 Training e Test

Test

The subjects were administered motor tests (Marella, Risaliti, 2007) for coordination and conditional skills to identify critical areas and draw up an effective motor program (Rietveld et al., 2019) which included, on average, 4-8 sessions of athletic and technical afternoon work on tennis (Castellani, Tamorra, D'Aprile, 1992).

Test n.1: Scoring (accuracy) relating to 10 shots, with a tennis ball without a racket, towards a scoreboard placed at 5 m (10m for the partners) divided into nine squares (1-9) made with a limb superior chosen by the athlete.

Test n.2: Scoring (accuracy) of 10 shots, with a tennis ball without a racket, towards a scoreboard placed at 10 m (20m for the partners) divided into nine squares (1-9) made with a limb superior chosen by the athlete

1	2	3
4	5	6
7	8	9

↑ Start

Test n. 3: repetition of test no. 1 with racket (total 10 shots).

Test n. 4: repetition of test no. 2 with racket (total 10 shots).

Each athlete made a total of 40 shots during the initial survey (20 without a racket and 20 with a racket) and 40 during the final survey.

3. Training

The motor proposals took care of both the technical-tactical aspect and that of athletic strengthening. In the first month, after the initial data collection, a weekly session of a mixed type was carried out, mainly oriented towards organic-muscular and postural development. In the second and third month, two weekly sessions were held, always of a mixed type, but paying more attention to the technical-tactical aspects of the discipline, also proposing a third session dedicated to the doubles match. Six sessions were held in the fourth month and the seventh was dedicated to the final data collection. The organization of the workout (Vitale, Weydahl, 2017), was subordinated to the actual motor skills of the participants, paying attention to the collaborative and inclusive effects.

3.1 Materials, structures and equipment

The technical materials and detection tools used were selected on the basis of the research objectives, the characteristics of the tests and the specificities of the proposed training path.

Regulation tennis court

Numbered squared board (1-9)

Tennis racket

Regular and weakened tennis balls

Detection grids

3.2 Methodology

The working methodology envisaged the development of a group motor path (Comoglio & Cardoso, 1996), applied to an individual discipline, which allowed the students to acquire both motor skills and transversal skills aimed at allowing relational improvements (Bond & Sargent, 1995). The sporting discipline of wheelchair tennis, despite having the characteristics of an individual sport, was considered suitable for pursuing the objectives of the research because the presence of the partners made it possible to verify the levels of collaboration and inclusion by developing, almost exclusively, sports courses centered on the conducting doubles competitions (Wheelchair and Partner athlete).

During training (Sindall, 2013), the analytical method was mainly used for the repetition of the exercises and technical gestures to be used during the competitions. The global option was used during doubles competitions by stimulating autonomous choices, determined by the dynamics of the game, together with the deductive approach for regulatory and motor development.

4. Results

From the initial screening, all the young athletes showed different results with the shots taken without the racket and then with the racket. At the beginning, shots taken with the tennis ball alone without the aid of the racket were more precise. During the final survey, at the end of the research period, improvements in the accuracy of shots were highlighted, both without and with the racket, highlighting the validity of the training program.

Initial detection

Athletes	Wheelchair Athletes		Partner	
	Total score of tennis ball shots on squared board (5m + 10m)	Total score of tennis ball racket shots on squared scoreboard (10m + 20m)	Total score of tennis ball shots on squared board (10m + 20m)	Total score of tennis ball racket shots on squared scoreboard (10m + 20m)
1	47	38		
2	45	33		
3	55	40		
4	39	24		
5			88	77
6			92	81
7			78	63
8			105	87

Table 1

Athletes	Wheelchair athletes		Partner	
	Total score of tennis ball shots on squared board (5m + 10m)	Total score of tennis ball racket shots on squared scoreboard (10m + 20m)	Total score of tennis ball shots on squared board (10m + 20m)	Total score of tennis ball racket shots on squared scoreboard (10m + 20m)
1	51	43		
2	46	39		
3	55	41		
4	41	26		
5			97	87
6			95	87
7			93	82
8			107	90

Table 2

The results obtained with the development of the research path were satisfactory as the numerical values elaborated in the initial phase are significantly improved in the final one.

Naturally, the group of partners highlighted the most evident improvements both in numerical terms and in terms of precision in carrying out the exercises.

The final survey made it clear that the performance of Wheelchair athletes improved by approximately 4% while those of the partners by approximately 9% with a specific increase in the percentage of shots made with the racket.

The sample, interviewed at the end of the work period, declared that he had acquired an awareness of the importance of mutual self and collaboration regardless of the condition of the individual.

Discussion and conclusion

The pilot study, developed for a period of approximately four months, was aimed at monitoring the sample's response to motor proposals in order to improve the performance of athletes by making them aware of the mechanisms of control, adaptation and collaboration.

The choice to detect the performance of young athletes practicing wheelchair tennis arose from the observation that disabled athletes were trying to equip themselves with non-coded tools to reach distant objects. Hence, the reflection of proposing a motor activity that involves the use of the racket, respecting the stages of the integration process (Angermeyer, Kilian, 1997) and of enhancing the concepts of socialization, collaboration, inclusion. The young people, while showing difficulties in the management of their own body as the automatic control systems of motor skills, mainly those that govern postural activity, enter into crisis due to the continuous changes that occur in the various growing body segments, have responded in positive way to motor proposals. Considering that today's adolescent spends most of his time at school or at

home, using video games and computers and even when he is engaged in any sporting activity, this in any case is not spontaneous but always guided by an adult, the research program aimed at inclusion through the sporting practice of Wheelchair Tennis was set up. All the young athletes declared that they had received benefits during the work period by participating in the afternoon technical-tactical and collaborative sessions. The use of specific equipment for strength enhancement has also resulted in greater awareness in the management of personal motor skills. They also pointed out that they found limited episodes of muscle contractures, greater accuracy in shooting and an increase in strength after carrying out exercises to compensate for muscle development. The study conducted testified that the use of specific training methods, conventional and otherwise, aimed at developing the motor skills of young athletes is effective in pursuing inclusiveness.

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