SPECIFIC EFFORT CONDUCTED IN ICE HOCKEY

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Abstract
Sports performance through training and competition is a complex stimulus to which the athlete's body responds by increasing exercise capacity, and also development of specific qualities and skills.
The sporting effort has a major impact on the increase of exercising capacity and performance, since it engages the overall energetic system in the body and it also requires great mental functions, leading thus to the development of the body's functional reserves, to constant bio-positive adaptations of the body and to the installation of overcompensation.
The two forms of exercising capacity (aerobic and anaerobic) do not evolve on parallel curves but on divergent ones, where the growth of one of them causes the stagnation or decline of the other. This aspect draws attention on how the goals must be set for each stage of training, and always considering sensible not to work together in order to develop both explosive strength and speed or force.
When it comes to the current training process of athletes, every form of exercising capacity should be developed separately, in accordance with the proportion of energy release (either aerobic or anaerobic) in specific effort of the ice hockey game.
Keywords: *effort characteristics, adaptation to effort and senior ice hockeyers*

INTRODUCTION

Surveys made during the latest major competitions (world and continental championships) have led the experts in the field to conclude that the specific features of the modern game of ice hockey are: the equal participation in both situations of the game (attack and defence), the trend of covering the entire field of play, and also frequent job and task changes as required. Therefore, players are expected to have **increased speed indices** (under all forms), **strength** (and **detention**), **speed endurance**, fine and quick specific technique, sense of orientation, the ability of good decision-making and good tactical training.

Characteristics of effort in ice hockey

After E. MONBAERTS (1991) [6], ice hockey is an intermittent sport where short periods of high-intensity are randomly interspersed by longer periods of recovery which may be either active (walking) or passive (immobility). Each sprint rarely exceeds five seconds, besides the acceleration process that goes until a phase of brutal slowdown with a change of direction.

A professional ice hockey match reaches 10 to 14 km, according to each and every position in the game, depending also on the type of animation and on the gaming systems. Of all 90 minutes of play there is a period of about 60 minutes of actual play. During these 60 minutes of actual play, there is an average of 3 km of jogging and 7 km of running with about 62% of aerobic slow race, 24% of race with average aerobic speed (10-17 km/h) and 14% of high intensity race (18-30 km/h) which often overturns the course of a match.

Most of the energy requirements during periods of low activity (jogging and race) and those of the recovery periods are covered by intensive aerobic energy production.

Most energy requirements during periods of intense physical activity (fast running, sprinting, half-turn, jump and shot) are covered by the anaerobic pathway (both non-dairy and dairy).

The number of short sprints (10-15 m) has increased, as technical and tactical actions with high intensity and covering short distance went from 88 in 1980 to 119 nowadays. The number of combat is also steadily growing.

After G. CAZORLA and A. FARHI (1998) [3], the energy delivered during footbal matches is supposed to come from **two main sources**: the first isthe catabolism of phosphates (ATP-PCR) and the aerobic glycolysis abundantly supplied during short intermittent exercising through the body's oxygen reserves, and the second source is the lactic glycolysis whose use depends on the intensity of the game imposed by the opponent.

One of the consequences is that "systematic" training regarding the lactic glycolysis is not required as a priority in ice hockey.

The longest distances are travelled by midfielders and side defenders, whereas central defenders go through the shortest distances; forwards establish themselves in between these two extremes.

Forwards and side defenders generally possess higher qualities of about 900m of sprints and 1600m of intensive running.

The values reached by midfielders are close to those observed in forwards (800m of sprints and 1500m of intensive running).

Central defenders register the worst qualities: 500m of sprints and 1300m of intensive running.

Lactic acid is far from being a limitative factor regarding ice hockey effort, but on the contrary it

gives the ability of carrying out strength, speed and aerobic power efforts, on an average fund of 6-12 ml lactic/mol, and thus remains an important skill during the game.

During a period of two thirds of a meeting of the average heart rate lies **> 85% of maximum FC** and in a more precise way:

- ✓ between 85% and 90% of the maximum FC over a period of 23 min (+ or - 5min);
- ✓ between 90% and 95% for a period of 17 min (+ or - 10min);
- ✓ between 95% and 100% for a period of 7 min (+ or - 5min).

A distribution of muscle fibres according to posts [2]

Distribution of muscle fibre at professional players

Position	Fibre I	Fibre II a	Fibre II b
Quarterback	44	7	49
Midfielder	67	16	17
Forward	38	22	40

Fibre I: slow oxidative fibres

Fibre II a and II b: fast fibres

Ice hockey body adaptation to specific efforts [1]

The specific effort in ice hockey requires both cardiac (central) and muscle (peripheral) adaptations of the ice hockey player's body during various situations of a game. The physiological adaptations that operate through training can be divided into central (i.e. oxygen transport system towards heart, lungs and blood) and peripheral (peripheral muscles) adaptations. The two must continually adapt to specific random requirements related to the strength rate (individual and collective) immediate to the ice hockey match. The combined effect of these adjustments results in better muscle oxygenation.

During each ice hockey match, the body must continually adapt to the requests of random efforts and counter-efforts, and this is where interest in intermittent working with varied and irregular applications comes from.

The specific effort in ice hockey is also an intermittent combination of motor actions:

- ✓ with ball: e.g. ball management + pass, control + shot;
- ✓ without the ball: e.g. straight running + block + kick brake;
- ✓ with and without the ball: e.g. head + sprint without ball + control + pass.

Individualized training is not new in the sport but it is becoming more and more common in ice hockey.

Every coach has his method of working with their own logic and coherence. These data that are also "general and specific", need to address in a more accurate way the analysis of the activity, and continually ensuring an optimisation of the performance. Each coach will be expected to use during the game their own well defined tactical game with their own principles. Thus, we should only consider our players efforts by both the tactical qualities at stake and our own beliefs.

"The relationship between the distance travelled during "total playing time" and "actual playing time" [4].

Some current studies also emphasise the fact that the analysis of the activity of a high-level ice hockeyer would be more precise if we would refer to the actual game time in order to calculate the distance travelled by a player in a match. The content and the combination of training sessions would therefore be more effective.

Analyses through passive tracking (amisco or prozone) are becoming more and more widespread. These analyses show that the total distance travelled during the second half of the time would fall with 4% to 9%, compared with the first half of time [5].

However, all these analyses are only calculated according to the total playing time and therefore never take as reference the activity of the player only during actual play time.

The analysis of the total distance travelled by a 4 – 4 – 2 team display on the field show that between 2611m and 3765m several game stops are made, about 26.08% to 29.48% of the total travelled distance. The same analysis of a team evolving with a 4 – 3 – 3 display on the field and going towards a 4 – 5 – 1 display on field will ensure an evolutionary scale between 2585m and 3342m of the distance travelled during the game stops about 24.87% to 30.08% of the total travelled distance.

CONCLUSIONS

These studies show that the orientation of the training should be in close connection with the qualities arising during **the actual play time**, without neglecting the races conducted during game stops, whose nature is to be defined (jogging, low and medium intensity race).

Classical qualitative analyses truly show that 3% of the total distance travelled is performed as sprint. Specific analysis in relation to actual game time allows assigning a larger percentage. It allows assessing the situation accurately, as it represents 4.8% of the total distance travelled during actual play time or an increase of 60%, which is not to be neglected.

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