

## **Some mathematical models to improve practitioners' skills in ball games. Perspectives of their use in basic and applied research.**

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The purpose of the communication is to introduce three mathematical models. They aim at optimizing, on the one hand, the acquisition of well-targeted technical and tactical gestures required in a particular or usual game situation and in the other hand, the management of the time devoted to the practice of the players.

In this perspective, their use will help to determine in an equation, in a given practice exercise, the needed number of balls and players so that the touch frequencies of the ball by the latter are optimized. Indeed, in theory as well as in practice, for a given situation, the more a practitioner touches the ball and the more likely he is supposed to acquire quickly and better the desired technical and tactical gesture. In addition, they would contribute to better manage the organization of the training through a time ratio more in favor of the practice compared to the time spent for the collection of balls.

Here is a non-exhaustive list of sports games where these formulas could find application: hockey, volleyball, basketball, soccer, pickleball, tennis, badminton, water polo ...

The origin of these models comes from the experience lived in the practice of sport with ball. Indeed, the exercises related to these models require an organization based both on the synchronization of the circuit of the ball in the training space and between the players. To do this, various game situations are created depending on whether the sport with ball is individual or collective. Even for the latter, performance is sought, through the specialization of players in well-targeted "positions" from the collective strategy. Finally, it is assumed that their use could open fields of opportunity for basic and applied research in industries and technology.