Abstract

Title: Identification of brain areas in anticipation during tennis

Objectives: The main aim of diploma theses is identification of brain areas responsible for anticipation and making decision during watching tennis rallies at tennis players by functional magnetic resonance.

Methods: The research group consists of 10-12 competitive tennis players aged 18-28. The research takes place at the hospital in Motol. Before the examination itself, the probands are instructed on the course and conditions of testing. Testing consists of examining the brain to see if the proband is healthy, testing anticipation with a video of tennis rallies followed by a resting state phase to evaluate regional interactions. The video consists of 6 blocks separated by a static image lasting 20 s. Each block contains 6 videos with tennis rallies. Each video lasts exactly 6 s, including 300 ms to stop the tennis rallies. The tennis rallies are stopped when the ball is over the tennis net or on the player's racket. The task of the proband is to monitor the tennis rallies and after stopping to determine whether the subsequent stroke will fly to the left or right side of the tennis court, or to the center. The target data are formed from functional magnetic resonance images, probands' responses to individual rallies, and response times. Responses and reaction times are then statistically evaluated. MatLab, SPM 12 is used to evaluate functional magnetic resonance images.

Results: The result of the diploma thesis is a list of activated brain areas as expected in anticipation during tennis. This list is very similar to the results from foreign studies. The speed of reaction times did not fully correspond to the position of players on the tennis rankings. The correctness of the answers did not fully correspond to the position of the players on the tennis rankings.

Keywords: anticipation, functional magnetic resonance, brain, tennis, tennis player, tennis rally