INTRODUCTION:
Strong physical performance is a fundamental part to accomplish success in professional handball. Since accelerations are a crucial part of movement in handball, it is not sufficient to evaluate total distance as volume and average velocity as intensity parameter. Metabolic power (MP) implements both acceleration and velocity and might better reflect (metabolic) demands in terms of match intensity (metabolic) in team sports. We hypothesize, that higher metabolic demands might lead to a better match outcome in top-level handball.

METHODS:
414 elite male handball players were included. During 65 matches of the EURO 2020, local positioning system data (Kinexon Precision Technologies) were collected (16.6 Hz), yielding 1853 datasets. We analyzed net playing time only with durations above 1 min. Goalkeepers and games resulting in a draw were excluded from the analysis. Average Metabolic Power (W/kg) an energy at high metabolic power (HE; >35 W/kg) per minute were processed and further used as predictors for success. We first standardized these values across the whole dataset and then calculated means and standard errors on those for each team and match. Next, a (Bayesian) logistic mixed effect measurement error was fitted with the brms package with match and team as random effects.

RESULTS:
The logistic regression shows favorable tendencies for higher metabolic demands toward success (MP: 0.67 W/kg; CI95% -128|2.66; HE: 1.03 J/kg/min; CI95% -0.88|3.08). However, these results are not conclusive due to widespread credibility intervals. The metabolic power and energy at high MP in winning teams is higher on average compared to the losing teams (MP: +0.12 W/kg; SE: 0.04; T=2.9; HE: +0.01 J/kg/min; SE: >0.01; T=3.3) when the win is the outcome. A sensitivity analysis using the goal difference outcome showed fewer benefits toward higher metabolic demands.

CONCLUSION:
Our study confirms that the playing intensity in winning teams is higher on average. Recent research show that wing players expend more energy at high metabolic power compared to other positions. Winger are the preferred position for fast counter-attacks which yield a high metabolic power, thus, a simple and efficient way of scoring is a big contributor to winning. For achieving success, greater involvement with the ball, more successful passes and the completion of skill-related activities might be of great importance and contribute more directly to success in comparison with match running performance.