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Association between Total Genotype Score and Muscle Injuries in Top-level Football Players: a pilot study

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INTRODUCTION:

Recently, genetic predisposition to injury has become a popular area of research and the association between a few Single Nucleotide Polymorphisms (SNPs) and the susceptibility to develop muscle injuries in football has been shown (1,2). This pilot study aimed to investigate the combined influence of common gene polymorphisms previously associated with muscle injuries in Italian football players.

METHODS:

Total of 64 Italian top-level football players (age 23.1 ± 5.5 years; height 179.3 ± 7.3 cm; weight 73.0 ± 7.9 kg) were genotyped for 4 gene polymorphisms (ACE I/D rs 4341, ACTN-3 R/X rs 1815739, COL5A1 C/T rs 12722, MCT1 A/T rs1049434). Genomic DNA was extracted using a buccal swab, and genotyping was performed using a PCR method. Structural-mechanical injuries and functional muscle disorders were collected over 10 years (2009-2019).

RESULTS:

Logistic regression analyses showed a significant association of all four polymorphisms with muscle injury incidence ($P < 0.01$), while the ACTN-3 and the COL5A1 polymorphisms were significantly associated with the severity of injury ($P = 0.042$ and $P = 0.012$, respectively). Moreover, the mean total genotype score (TGS) was significantly higher in injured than in non-injured (control) football players (Injured: 57.5 ± 15.5 vs non-injured: 36.6 ± 13.7 , $t = 6.33$, $P < 0.001$) and it was a strong predictor of muscle injury (OR=2.93, 95%CI: 0.06-0.18, $P > 0.001$).

CONCLUSION:

These data suggest that the carriage of a high number of "protective" gene variants could influence the individual susceptibility to develop muscle injuries in football. Further studies are needed to confirm these findings in other professional football player cohorts.

References

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