PENGARUH POLIMORFISME GEN ACTN3 TERHADAP PERUBAHAN DAYA LEDAK PASCA INTERVENSI *PLYOMETRIC TRAINING*

Studi pada Mahasiswa Unit Kegiatan Mahasiswa (UKM) Olahraga Fakultas Kedokteran Universitas Jenderal Soedirman

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ABSTRAK

Latar belakang: Gen ACTN3 mengkode pembentukan protein α-aktinin-3 pada serat otot tipe cepat. Polimorfisme gen ACTN3 dapat mempengaruhi daya ledak otot. *plyometric training* merupakan metode latihan yang mampu meningkatkan daya ledak.
Tujuan: Penelitian ini bertujuan mengetahui pengaruh polimorfisme gen ACTN3 terhadap perubahan daya ledak pasca intervensi plyometric *training*.
Metode: Desain penelitian ini adalah quasi eksperimental *pre and posttest design without control*. Sebanyak 23 orang laki-laki berusia 18-25 tahun dipilih menjadi subjek penelitian dengan metode *consecutive sampling.* Setiap subjek menjalani tahapan penelitian, yaitu pengukuran daya ledak dengan *vertical jump test* sebelum dan setelah *plyometric training*, serta mengikuti regimen *plyometric training* selama 5 minggu dengan frekuensi latihan dua kali seminggu. Subjek dibagi menjadi 3 kelompok berdasarkan polimorfisme gen ACTN3 (RR, RX, dan XX).
Hasil: Hasil uji T-berpasangan menunjukkan perbedaan bermakna antara daya ledak sebelum dan sesudah intervensi *plyometric training* ($p<0,05$). Hasil uji Kruskal Wallis menunjukkan terdapat perbedaan bermakna antara polimorfisme gen ACTN3 dengan perubahan daya ledak pasca intervensi *plyometric training* ($p<0,05$). Perubahan daya ledak tertinggi pada genotip RX (10,6 ± 2,1 cm). Uji *post hoc* Mann Whitney menunjukkan perbedaan yang signifikan antara kelompok genotip RX dengan RR dan RX dengan XX ($p<0,05$).
Kesimpulan: Polimorfisme gen ACTN3 berpengaruh terhadap perubahan daya ledak pasca intervensi *plyometric training* pada mahasiswa UKM olahraga Fakultas Kedokteran Universitas Jenderal Soedirman.

Kata Kunci: daya ledak, *plyometric training*, polimorfisme gen ACTN3

THE ROLE OF ACTN3 GENE POLYMORPHISM ON EXPLOSIVE POWER CHANGES AFTER PLYOMETRIC TRAINING INTERVENTION
Study on Student of Sport Activity Unit (SAU) of Faculty of Medicine Jenderal Soedirman University

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Abstract

Background: *The ACTN3 gene encodes α-actinin-3 proteins on fast type muscle fiber. The polymorphism of the ACTN3 gene can influence the performance of individual muscle explosive power. Plyometric training is a training method which is proved to increase individual sport performance.*
Objective: *This study was done to understand the effect of the ACTN3 gene polymorphism on explosive power after plyometric training intervention.*
Method: *This research was using quasi-experimental design with pretest and posttest design without control. Subjects of 23 men aged 18-25 years old were selected by consecutive sampling method. Each subject completed every stages of the research, the measurement of explosive power before and after plyometric training, and five weeks with two training sessions each week. Explosive power measurement was carried out by vertical jump test. Subjects were divided into three groups based on their gene polymorphism of ACTN3 (RR, RX and XX).*
Result: *The result of paired T-test shows significant difference between the explosive power before and after plyometric training. The result of Kruskal Wallis test shows that there is a significant difference of the ACTN3 polymorphism on explosive power changes after plyometric training intervention ($p<0,05$). The greatest changes of explosive power changes is in the RX group ($10,6 \pm 2,1$ cm). Post hoc Mann Whitney tests on changes in explosive power showed significant difference between RX and RR, RX and XX ($p<0,05$).*
Conclusion: *The ACTN3 gene polymorphism influence explosive power on student of sport activity unit of Faculty of Medicine Jenderal Soedirman University after completed plyometric training.*

Key words *: ACTN3 gene polymorphism, explosive power, plyometric training*