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The rugby side-on tackle: on-field comparison between young and senior international élite athletes for technique enhancement and injury prevention.

Davide Pavan[1], Federica Cibin[1], Annamaria Guiotto[1], Fabiola Spolaor[1], Andrea Sgorlon[2], Antonio Pavanello[2], Tiziano Casagrande[2], Giorgio Sbrocco[2], Zimi Sawacha[1]
[1]Department of Information Engineering, University of Padua, Padua, Italy.
[2]Italian Rugby Federation, Rome, Italy

Abstract

Introduction
During a Rugby match, the tackle has been recognized as the task leading to the higher number of injuries, therefore to the higher recovery time needed. [1,2] Since young age, the players have been reported to place more interest on the tackle outcome, rather than on their own safety [3]. Despite injury rate has already been correlated with athletes' age [4], literature reports no information about technique comparison between young and experienced athletes. The aim of the present study is to investigate the tackling technique in international élite young and senior athletes, to highlight differences both in technique effectiveness and ACL injury risk.

Methods
5 athletes from Benetton Rugby Treviso (mean ± standard deviation (SD) BMI: 29.26±4.41, age: 24.20±4.49 years), and 5 athletes from the Italian Rugby Federation (FIR) U18 Academy (mean±SD BMI: 28.32±2.96, age: 17.13±0.64 years) participated in the study. All the athletes take regularly part in international fixtures. Participants, after signing informed consent, performed 4 repeating side-on tackles in the rugby field. Video sequences and plantar pressure (PP) distribution were acquired by means of a Novel Pedar system and 4 synchronized cameras (GoPro Hero3+); hence peak vertical ground reaction force (PV) was extracted, and specific features were tracked directly on the motion sequences [5,6]. Key instants were identified as: left foot PV, right foot PV, instant of contact between players.

At key instants, hip, knee and ankle joint sagittal plane kinematics, together with both sagittal and coronal plane moments were evaluated with a purposely

developed Matlab code. Their occurrence, with respect to the tackle task, was also determined.

Tackler's centre of mass (CM) acceleration was calculated based on 2D trajectory reconstruction; hence CM's peaks were recognized in specific phases: start-contact (SC), contact-grounding (CG), and grounding-ball retrieve (GR).

Student's indipendent T-Test was used to detect differences between the two groups of atheletes (IBM SPSS Statistics 19).

Results
Outcome variables were reported in Figure 1.

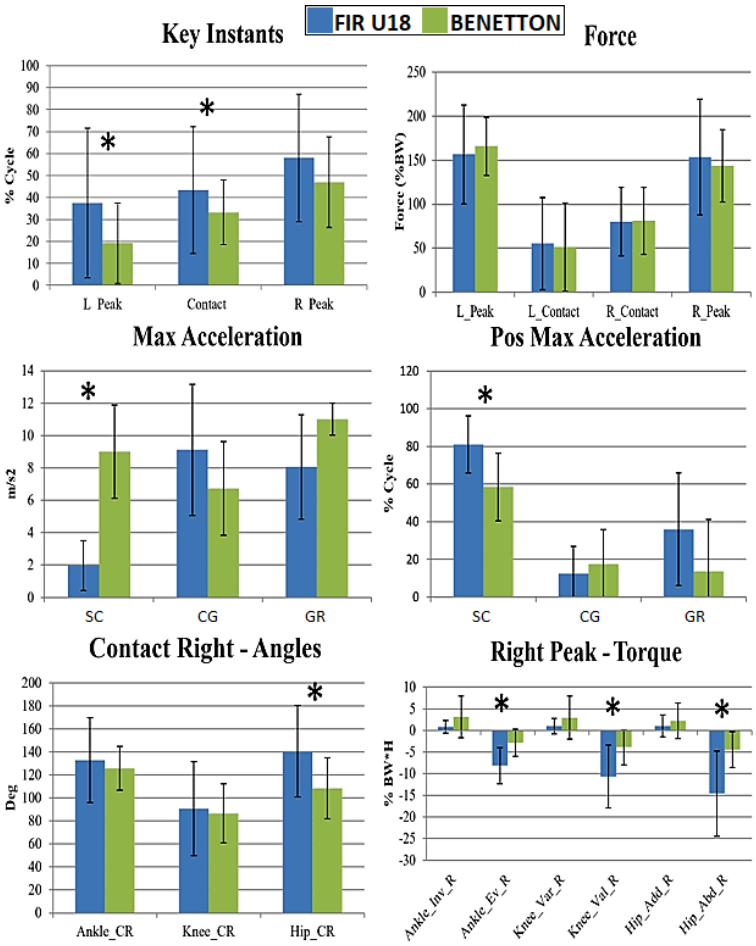

***Figure 1**: Key instants, PV, CM acceleration peak and position, joints kinematics and moments. (* = p< 0,05).*

Discussion
The more experienced athletes displayed a quicker, hence more confident, execution of the tackle, while keeping the valgus torque at low values. The lack in experience affected the tackling efficiency and posture in FIR U18 athletes, exposing some of them to ACL injury risk. This screening tool can be used directly onfield thus enabling coaching and clinical staff, to improve players safety and effectiveness, in an enviroment closer to competitions.

References

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