RELATIONSHIP BETWEEN SCRUMMAGING STRENGTH AND STANDARD FIELD TESTS FOR POWER IN RUGBY

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INTRODUCTION: In the game of rugby, the development of leg power is of particular importance for forwards in the scrum and maul. The forward is required to hold the push in the scrum and give an explosive push when the ball is put in. The most frequently used standard field tests for leg power according to Nicholas (1997), which are also recommended in numerous training manuals and by the England Rugby Football Union (RFU), are the vertical jump and a timed short sprint test. This study was designed to compare performance scores attained and the maximal force applied in these tests with the maximal force which could be applied against the pneumatically controlled Predator individual scrummaging machine.

METHODS: Ten college level rugby forwards (age: 19 - 22 years, body mass: 101.5 ± 15.5 kg) were tested performing a maximal standard vertical jump from a Kistler force platform and a 15m sprint from a standing start through a photo-electric timing system which recorded times at 5m intervals. Following familiarisation with the Predator equipment, the subjects were then required to apply maximal force using their most efficient and effective scrum technique against the pneumatic scrum machine. The equipment allowed the subjects to move through a knee angle of 120° for greatest force application (Zatsiorsky, 1995) to maximum extension, while keeping the hips horizontal with the shoulder or slightly below, providing sufficient resistance to measure maximal force application in kilograms. Height jumped and maximal force data from the force platform, the fastest times from the sprint data and the calculated average force from the subjects' mass and sprint times, were correlated with the maximal force applied during scrummaging against the Predator machine.

RESULTS AND DISCUSSION: Rugby studies which have used the vertical jump and sprint tests have only compared performance between players based on height jumped and movement time over specified distances. When comparing the scrum force with the best vertical jump height, Pearson correlation analysis showed there was an insignificant relationship ($r = 0.38$), whereas with maximal vertical force application a much stronger relationship ($r = 0.67$, $p<0.05$) was demonstrated. There was no relationship between scrum force and the sprint times at 5m ($r = -0.26$), 10m ($r = -0.06$) or 15m ($r = 0.05$). However, when body mass was taken into consideration with the calculation of the average force during each of 5m, 10m and 15m sprints, high correlations of $r = 0.88$, $r = 0.88$, and $r = 0.90$ (all p values < 0.001) respectively were obtained. This demonstrates that the raw data of these recommended standard tests is of little use in evaluating the ability of forwards to apply force in a scrum. The raw data needs to be converted into appropriate units which take into account the subjects mass and have a direct, accurate and pertinent relationship with the performance objectives of the playing position. Most training and testing manuals and the England (RFU) Fitness Test Protocols do not take this fact into consideration.

CONCLUSION: The highest relationship between scrum force and the standard tests for leg power were obtained for sprinting when the time data was converted to average force. Without this additional calculation the data is meaningless. This provides all rugby clubs with a relatively simple test for rugby related leg power. However, clubs should consider adopting rugby specific tests which measure performance directly, thereby increasing confidence in the validity of the test data.

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