

ASSESSMENT OF SCRUMMAGING PERFORMANCE USING A PNEUMATICALLY CONTROLLED INDIVIDUAL SCRUM MACHINE

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INTRODUCTION: The game of rugby places specific physical performance demands on players due to the unique phases inherent within the game. Scrummaging is a vital phase of the game, in which domination boosts the whole team performance as a result of pressurising the opposition and denying them quality possession (Greenwood, 1992). Effective scrummaging requires not only explosive leg power, but also the correct technique in order to control and channel the power within the positional constraints of the scrum. To accurately assess the scrummaging performance of players, tests must incorporate the specific technical skills required during scrummaging. The purpose of this study was to evaluate the capabilities of the pneumatically controlled Predator individual scrummaging machine to effectively assess scrummaging performance.

METHODS: Twelve college level rugby forwards (age: 19 - 22 years, body mass: 101.5 ± 14.6 kg) participated in the study. Following familiarisation with the Predator equipment, the subjects were required to apply maximal force using their most efficient and effective scrum technique against the pneumatic scrum machine. The Predator machine consists of a padded scrummaging head mounted to two compressed air rams which provide sufficient resistance to measure maximal horizontal force application, displayed in kilograms on a laboratory calibrated pressure gauge. Scrummaging performances were videoed for technique assessment. Coordinates of the subjects' joint centres were reconstructed from digitised video data using 2D DLT. Subjects also performed a maximal squat jump from a static position, with an ideal scrummaging knee angle of 120° (O'Shea, 1996), from a Kistler force platform. Maximal force data generated during the non skill demanding squat jump were correlated with the maximal force applied during scrummaging.

RESULTS AND DISCUSSION: Although both tests were measuring explosive leg strength, Pearson correlation analysis showed only a moderate relationship with a correlation of $r = 0.55$ ($p = 0.06$). Initial analysis of the video data, in relation to the squat jump data, appears to indicate that subjects that achieved relatively higher force values during scrummaging tend to display technique similar to that recommended in the rugby literature (Greenwood, 1992; O'Shea, 1996), and was distinctively different from the poor technique displayed by subjects that performed significantly worse during scrummaging. They were able to maintain their back in a near horizontal position with shoulders slightly above hips, and generate the power predominantly from the legs, evidenced by rapid knee extension during the initial 0.3 s of movement (average ang. vel.: 49.6 deg.s^{-1}). Subjects that displayed poor technique had a slow rate of knee extension (average ang. vel.: 22.5 deg.s^{-1}) and relied on excessive dropping of the hips to initiate the movement of the scrummaging head, causing an increased back angle, resulting in an ineffective drive. This disparity in maximal force values between the two tests, as a consequence of poor scrummaging technique, demonstrates that accurate assessment of physical performance requires sport specific tests, that replicate the demands of the game.

CONCLUSION: The pneumatically controlled Predator individual scrummaging machine is capable of distinguishing players that perform well during scrummaging, from those that have a good level of explosive leg strength but limited scrummaging technical skills. With the new era of professional rugby and an increased scientific approach, rugby clubs should evaluate the validity of the physical tests they currently use in order to ensure that individualised training programmes address the real weaknesses, thereby improving the preparation of

players for competition.

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