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学位の種類	博士 (体育学)
学位記番号	第 1 0 号
学位授与の要件	学位規則第 4 条第 1 項該当
学位授与年月日	平成 2 1 年 3 月 2 4 日
学位論文題目	Determinants of the abilities to jump higher and shorten the contact time in a running one-legged vertical jump in basketball
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論 文 概 要

In basketball, improving jumping abilities markedly enhances individual competitive performance. When shooting, depending on defender actions, a shooter must decide whether to jump with one or two legs. These jumping abilities involve jumping height and contact time. In competition, if an offensive player can jump high and quickly, then a player is more likely to disrupt the timing of defenders, draw a foul, and shoot the ball. When comparing running one-legged and two-legged vertical jumps, there is no marked difference in jumping height, but a running one-legged vertical jump has a shorter contact time. In studies on the running one-legged vertical jump, there have been reports on the high jump and long jump in track and field, but because people compete for height and distance in these athletic events, there have not been many studies that analyzed contact time as one of the factors determining jumping performance.

The running one-legged vertical jump in basketball requires comprehensive abilities to efficiently carry out ballistic and stretch-shortening cycle movements. With the drop jump, in which a person jumps off of a stand, lands, and then immediately jumps, and the repeated rebound jump, in which a person successively and quickly jumps vertically, these basic jump indexes that were calculated based on contact time and jumping height (jumping height / contact time) have been used to assess ballistic stretch-shortening cycle movements. Many studies on basketball players have analyzed jumping techniques, but there have only been a few studies that measured jumping index.

In the present study, the above-mentioned assessment method was applied to assess the abilities to jump higher and shorten the contact time of the running one-legged vertical jump in an attempt to ascertain determination factors and efficacy.

This study was conducted to obtain useful information for developing training techniques of running one-legged vertical jump in basketball (lay-up shot jump). The ability of the lay-up shot jump and various basic jumps were measured by testing 19

male basketball players. The basic jumps consisted of one-legged repeated rebound jump, two-legged repeated rebound jump, and countermovement jump. Jumping height, contact time, and jumping index (jumping height / contact time) were measured and calculated by a contact mat / computer system that recorded the contact and air times. The jumping index means power. The lay-up shot jump was the highest index jumping technique among the different jumps. No significant correlation existed between jumping height and contact time of lay-up shot jump, the two components of lay-up shot jump index. As a result, jumping height and contact time were found to be mutually independent abilities. Relationship of contact time between lay-up shot jump to one-legged repeated rebound jump and two-legged repeated rebound jump correlated on the same significant levels ($p < 0.05$). A significant correlation for jumping height existed between one-legged repeated rebound jump and lay-up shot jump ($p < 0.05$), although none existed for jumping height between lay-up shot jump and both two-legged repeated rebound jump and countermovement jump. The lay-up shot index correlated more strongly to one-legged repeated rebound jump index ($p < 0.01$) when compared to two-legged repeated rebound jump index ($p < 0.05$). These results suggest that one-legged repeated rebound jump is effective in improving both contact time and jumping height in lay-up shot jump.

These findings are useful for evaluating ability to perform running one-legged vertical jumps in basketball and examining training techniques to improve ability to perform running one-legged vertical jumps in basketball.

論文審査の要旨

本論文は、バスケットボールにおける助走付き片脚踏切ジャンプ (Lay up shoot jump, LSJ) の能力を測定評価する方法を新しく開発したものである。また、新しい測定法から得られる指標と、これまでの跳躍力テストによる指標との関係を検討することによって、測定データの評価診断法についても言及している。具体的には、接続式マットスイッチを2枚組み合わせて用いると、前方への移動を伴ったLSJの接地時間と跳躍高を精度よく簡単に計測できるとともに、この2要因からパワー指数も算出できることを示している。また、これらの2要因の間には相関関係が見られないことから、LSJ遂行時において、運動遂行時間を短縮する要因と、高い跳躍高を獲得する要因とは、互いに独立した関係にあることを示唆している。さらに、パワー指数とこれを形成する2要因に対する、その場での両脚リバウンドジャンプ能力や、片脚リバウンドジャンプ能力との構造的な関連性についても明らかにしている。LSJを最上位に位置づけ、各種ジャンプ力との関係性を示した構造モデルの提示は、助走付き片脚踏切ジャンプ力のトレーニングを考える際に役立つ指針となるものである。これらの知見は、バスケットボールによる競技力向上のために役立つとともに、体育科学が取り組むべき重要な課題の一つを解決した研究である。