



A SIMPLE SYSTEM TO HELP FIND NATURAL TALENTS IN JUVENILE BASKETBALL

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Abstract: In this paper we aim to pick a set of students of the same age, students which had no prior training in basketball, and record them while throwing the ball to the basket, the main interest being to find the important angles of their throw, in order to see how close those angles are to those which the trainers consider to be the optimal ones for their age group.

Keywords: juvenile basketball, motion analysis, training

1. INTRODUCTION

The idea of this paper came after a discussion with a primary school sports teacher, who was complaining about not having enough tools to be sure he made the correct selection when it comes to distribution of pupils to different sports at sports classes. Mostly, he bases his decisions on physical parameters (the tall students follow sports like volleyball and basketball etc.) In this paper, we aim to provide a method to identify juvenile talents when it comes to the free throw at basketball.

2. MEANS AND METHODS

First of all, the system which we propose should be inexpensive, ideally portable (or, at least, we should be able to install it on the basketball court) and simple enough so that people without any experience will be able to use it after basic training.

The system which we propose uses a video camera to record the free throw and a free software application which is able to analyze that throw and extract the angles of interest. Even though a regular camera, able of providing 30 frames per second, can give an idea about some parameters of the throw (like the angles, which are considered in this paper) [1][2][3], we must accept the fact that the free throw is determined by a fast motion of the arms. Considering that, at some point of the analysis, we might be interested in some kinematic parameters such as velocities and accelerations, we would recommend a high-speed video camera (120+ frames per second should be enough for simple kinematic analysis).

The camera is installed perpendicularly to the direction of the jump, at a height of 1 to 1.8 meters from the ground (this might be changed depending on the age group of students) and 3 to 5 meters to the subject, so that it captures the motion of the performers from the side. Markers, consisting of pieces of common white paper, were attached on the students, at the main joints of the arms: hand, elbow, shoulder

As software, we used a free application called Kinovea (www.kinovea.org) which helped us track all the angles we needed [4].

3. RESULTS

We used the high-speed video camera Fastec TS3-100S to record the free basketball throw for 14 volunteers, chosen randomly from a set of students of 17 years old. The camera was installed orthogonally to the direction of the throw, at a distance of 3 meters and a height of 1.1 meters from the ground. We considered two postures for the students' body: the "preparation" position, where the students sets up the throw (we measured three angles here: the angle of the knee and the angle between the arm and the torso and the angle between the forearm and the arm) and the "throwing" position, where we measured two more angles again, in the exact moment when the ball leaves the hands of the subject (the angle between the arm and the torso and the angle between the forearm and the arm).



Figure 1: Angles for the free throw of an amateur player

Table 1: The amateur players' angles for the free throw

Student no.	Height (m)	Mass (kg)	Knee angle preparation	Arm-torso preparation	Arm-forearm preparation	Arm-torso throwing	Arm-forearm throwing
1	1.83	80	119°	90°	79°	112°	175°
2	1.68	68	112°	82°	115°	128°	178°
3	1.79	81	114°	93°	112°	97°	160°
4	1.68	69	109°	65°	102°	128°	169°
5	1.84	81	124°	72°	114°	112°	167°
6	1.72	71	112°	64°	97°	115°	148°
7	1.88	85	117°	66°	96°	114°	147°
8	1.82	78	133°	58°	111°	110°	161°
9	1.79	80	133°	80°	115°	125°	165°
10	1.83	85	135°	60°	104°	106°	148°
11	1.74	76	106°	66°	93°	120°	157°
12	1.68	66	127°	48°	86°	108°	138°
13	1.67	69	150°	52°	80°	100°	137°
14	1.74	73	122°	76°	77°	128°	155°

3. CONCLUSIONS AND FUTURE WORK

The system which we propose can efficiently provide trainers with the angles of the free throw in both the preparation position and in the throwing position, so significant throwing technique errors can be identified with ease. Also, the system can be used with success to identify subjects which have natural talent for this sport (regarding the free throw) and generate good free throw angles.

The free basketball throwing motion of our subjects is very complex and contains many faults, which is normal, considering that we analyze completely amateur players, which had no contact with basketball training. There

are more parameters which we are working on, for example we observed that some of the students make a quick jump on the heels in the moment of the throw; others have the heels up in the preparation position while most of them have the feet flat on the ground. We're currently trying to find the correct ways to fit these events into our analysis. Also, we are aware that the tendencies regarding the angles of the throw are different for different age groups, so we plan a complete analysis of differences between our results and the considered ideal angles. Also, kinematic parameters are in plans for future work.

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