DETERMINING THE EXPLOSIVE POWER LEVEL
OF THE LOWER LIMBS TO THE WOMEN’S VOLLEYBALL
TEAM CSU MEDICINA TG. MURES IN THE COMPETITIONAL
SEASON OF 2022-2023

Cristian GRAUR¹*, Cristian SANTA²

ABSTRACT. Introduction: Explosive lower body strength in volleyball is a
constant challenge for every coach and physical trainer who is involved in
training a team. The concern is mostly important not only due to the vertical
jump but also due to the movement in the field. During the game of volleyball,
because of the small dimension of the court, the first 2-3 steps, the starting
steps are crucial in the successful execution of each phase during the game.

Methods: To detertoase of or area of interest in a representative volleyball
team, we applied two tests using the optojump device, as follows: 15 sec jumps
test and 30 sec jumps test. Objective: These two tests were performed at the
beginning of the training season in order to see the level of explosive strength
parameters Results: These parameters were analyzed for each subject as well
as for the entire tested team. The average height reached by the center of
gravity for the entire team during the 15 sec jumps test is 20.1 cm, while the
average jumps in the 30 sec jumps test is 16.6 cm. Analyzing the explosive force
parameters shows the direction in which the team’s physical training should
be designed.

Keywords: volleyball, optojump, explosive power

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REZUMAT. Determinarea nivelului forței explozive a trenului inferior la echipa de volei feminin CSU Medicină Tg. Mureș în sezonul 2022-2023. 

Introducere: Forța explozivă la nivelul trenului inferior în jocul de volei reprezintă o provocare constantă pentru fiecare antrenor și preparator fizic care este angrenat în pregătirea unei echipe. Preocuparea este în mare parte importantă nu doar datorită desprinderii pe vertical, ci și datorită deplasării în teren. În jocul de volei, terenul are dimensiuni mici, iar primii 2-3 pași, pașii de pornire, sunt cruciați în executarea cu succes a fiecărei faze din timpul jocului. 


Cuvinte-cheie: volei, optojump, forță explozivă

INTRODUCTION

The testing was done at the women’s volleyball team CSU Medicina Târgu Mureș at the beginning of the season 2022-2023. The number of participants to the test was 14 volleyball players. The competition they participated in was A2 Romanian National Championship. Volleyball is characterized by a great number of jumps, skips, hops and other kinds of take-off (Abendroth-Smith & Kras, 1999). Explosive lower body strength in volleyball is a constant challenge for every coach and physical trainer who is involved in training a team. Maximal strength represents the support in the development of dynamic strength and subsequently, of explosive strength (Bompa & Carrera, 2006). The explosive power in volleyball. During the match, a volleyball player performs over 100 jumps in either of the four elements: attack, block, serve or playing the ball. The number of jumps differs according to the player’s role and his specialization (Lobletti et al., 2010). The aim of the plyometric regime is to develop the ability of the muscles to generate maximal work in the shortest possible time. This occurs as an effect of the reduction in the time required for the switch from a stretch to contraction (Smith, 1996). The follow-up of a physical training program through plyometric exercises determines increases in the speed of execution and the height of jumps (Lehnert et al., 2009; Myer et al., 2006). The vertical
jump is important in volleyball because of the need to hit the ball around the
opponent on the opposite side of the net (Schaal, 2011). The maximum exploitation
of an athlete's potential is possible only when the training is systematically planned in
the long-term (Neagu, 2015, p. 47). The test execution was made in the training
hall after warming up for 30 minutes. The warm-up consists in 10 minutes easy
running, 10 minutes of stretching and 10 minutes of running school. Owoeye et al.
(2018) showed that neuromuscular exercises significantly reduced the risk of
ankle sprain in juvenile football and basketball players. Zakaria et al. also found
there was no significant difference between dynamic stretching and dynamic
plus static stretching in the prevention of lower limb, core and back injuries in
high school male football players After warm-up, the tested subjects started
with the 15 sec. jump and after all the subjects were tested, the second test was
made 30 sec. jump.

METHODS

The testing was done with the Optojump device. It is an innovative system
of analysis and measurement that brings a new philosophy of assessment and
optimization of performance to the world of competitive sport: it is designed
for the development of a specific and customized training programme for the
athlete, based exclusively on precise objective data. It is an optical measurement
system consisting of a transmitting and receiving bar (Microgate, n.d.). In order
to determine the level of explosive force, two tests were used: 15 sec jump test
and 30 sec jump tests. Vertical jumps were performed for 15 seconds and 30
seconds. During the test, the hands were positioned on the hips.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Kg</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. C.</td>
<td>51</td>
<td>176</td>
</tr>
<tr>
<td>A.B.</td>
<td>76</td>
<td>188</td>
</tr>
<tr>
<td>B.D.</td>
<td>77</td>
<td>181</td>
</tr>
<tr>
<td>M.F.</td>
<td>73</td>
<td>191</td>
</tr>
<tr>
<td>D.M.</td>
<td>68</td>
<td>187</td>
</tr>
<tr>
<td>N.E.</td>
<td>67</td>
<td>179</td>
</tr>
<tr>
<td>C.A.</td>
<td>52</td>
<td>163</td>
</tr>
<tr>
<td>D.A.</td>
<td>57</td>
<td>173</td>
</tr>
<tr>
<td>P.E.</td>
<td>63</td>
<td>171</td>
</tr>
<tr>
<td>G.D.</td>
<td>61</td>
<td>185</td>
</tr>
<tr>
<td>C.M.</td>
<td>67</td>
<td>182</td>
</tr>
<tr>
<td>P.D.</td>
<td>56</td>
<td>176</td>
</tr>
<tr>
<td>M.M.</td>
<td>69</td>
<td>185</td>
</tr>
<tr>
<td>S.L.</td>
<td>66</td>
<td>172</td>
</tr>
<tr>
<td>S.A</td>
<td>51</td>
<td>176</td>
</tr>
</tbody>
</table>
With the help of Optojump software we analyzed:
- The ability to jump high and reach maximum height quickly represents a success in volleyball (Potteriger et al., 1999). Explosive strength in the lower extremity is responsible for a good jump (Smith, 1996).
- The height to which the center of gravity reaches for each player tested and also for the whole team. We determined the value of the best result and the value of the worst result.

OBJECTIVE

To determine the level of explosive power in the tested volleyball team; analyzing and interpreting the results obtained; identifying the best and the worst result; the average of the results obtained by the whole team; indication of the direction in which to do the physical training.
RESULTS

These parameters were analyzed for each subject, as well as for the entire tested team. The average height reached by the center of gravity for the entire team during the 15 sec jumps test is 20.1 cm, while the average jumps in the 30 sec jumps test is 16.6 cm.

Table 2. Results in 15 and 30 sec jump test

<table>
<thead>
<tr>
<th>Subject</th>
<th>15 sec jump test (average) cm</th>
<th>30 sec. jump test (average) cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.C.</td>
<td>19.3</td>
<td>14.1</td>
</tr>
<tr>
<td>A.B.</td>
<td>18.3</td>
<td>15.6</td>
</tr>
<tr>
<td>B.D.</td>
<td>20.9</td>
<td>17.9</td>
</tr>
<tr>
<td>M.F.</td>
<td>18.6</td>
<td>15.7</td>
</tr>
<tr>
<td>D.M.</td>
<td>18.0</td>
<td>14.1</td>
</tr>
<tr>
<td>N.E.</td>
<td>19.4</td>
<td>14.1</td>
</tr>
<tr>
<td>C.A.</td>
<td>24.3</td>
<td>20.0</td>
</tr>
<tr>
<td>D.A.</td>
<td>22.4</td>
<td>19.3</td>
</tr>
<tr>
<td>P.E.</td>
<td>18.7</td>
<td>16.0</td>
</tr>
<tr>
<td>G.D.</td>
<td>19.2</td>
<td>15.5</td>
</tr>
<tr>
<td>C.M.</td>
<td>21.5</td>
<td>17.3</td>
</tr>
<tr>
<td>P.D.</td>
<td>20.3</td>
<td>17.0</td>
</tr>
<tr>
<td>M.M.</td>
<td>22.2</td>
<td>18.9</td>
</tr>
<tr>
<td>S.L.</td>
<td>17.6</td>
<td>13.8</td>
</tr>
<tr>
<td>S.A.</td>
<td>21.3</td>
<td>19.3</td>
</tr>
</tbody>
</table>

The average result in the 15 sec. jump test for the tested team is 20.1 cm, with a minimum average on subject S.L. of 17.6 cm and maximum average on subject C.A. of 24.3 cm.

Figure 3. Graphical representation in 15 sec jump test
The average result in 30 sec jump test for the tested team is 16.6 cm, with a minimum average on subject S.L. of 13.8 cm and maximum average on subject C.A. of 20.0 cm.

As we can observe, the same subject obtained the minimum value and maximum value on both tests. In the 30 sec jump test, the average of the flights obtained is lower compared to the result obtained in the 15 sec jump test.

CONCLUSION

As we can see, the direction in which physical training should be oriented to the tested volleyball team!!?:
- increasing strength parameters in all forms of manifestation;
- increasing speed parameters in all forms of manifestation;
- increasing the explosive power indices;
- increasing the level of explosive power in condition of endurance.

All these indications must be applied and introduced in the physical training of the tested volleyball team.

In physical training, the exercises must imitate the motor pattern specific to the game of volleyball. It is important to note that the test used to find out the level of the explosive power at the lower limbs must be performed periodically throughout the entire competitional season depending on the obtained results we can model the physical training according to the needs of the tested team.
REFERENCES


