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# External Loads in Under-12 Players during Soccer-7, Soccer-8, and Soccer-11 Official Matches

**Mario Sanchez [1,*], Rodrigo Ramirez-Campillo [2,3], Daniel Hernandez [4], Manuel Carretero [1], Jesus Maria Luis-Pereira [4] and Javier Sanchez-Sanchez [1]**

1 Research Group Planning and Assessment of Training and Athletic Performance, Universidad Pontificia de Salamanca, 37007 Salamanca, Spain; mcarreterogo@upsa.es (M.C.); jsanchezsa@upsa.es (J.S.-S.)
2 Human Performance Laboratory, Department of Physical Activity Sciences, Universidad de Los Lagos, Osorno 5290000, Chile; r.ramirez@ulagos.cl
3 Centro de Investigación en Fisiología del Ejercicio, Facultad de Ciencias, Universidad Mayor, Santiago 7500000, Chile
4 Faculty of Education, Universidad Pontificia de Salamanca, 37007 Salamanca, Spain; danielhdez10@hotmail.com (D.H.); jesuspereira77@gmail.com (J.M.L.-P.)
* Correspondence: msanchezga@upsa.es

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**Abstract:** The aim of this study was to compare the external loads (i.e., displacement distances and velocities) of 10–11 years-old soccer players during Soccer-7 (i.e., seven-a-side), Soccer-8 (i.e., eight-a-side), and Soccer-11 (i.e., eleven-a-side) official matches. Male athletes ($n = 133$; age, 10.9 ± 0.8 years) were measured during official matches for total distance (TD), relative distance (Drel), maximal velocity (Vmax), acceleration (ACC), deceleration (DEC), and absolute and relative distance covered at different velocities. Data during matches were collected using a Global Positioning System unit. Greater TD was recorded during Soccer-11 compared to Soccer-7 and Soccer-8 ($p < 0.01$), and greater Drel during Soccer-11 compared to Soccer-8 ($p < 0.05$). Absolute ACC was greater during Soccer-11 compared to Soccer-7 ($p < 0.01$), although relative values for %ACC and %DEC were greater during Soccer-7 and Soccer-8 compared to Soccer-11 ($p < 0.01$). Globally, results show that Soccer-11 matches induce greater external loads compared to Soccer-7 and Soccer-8 matches. Current results may help coaches and soccer-related organizers to plan more suited soccer competitions for young players, with lower external loads.

**Keywords:** children; youth sports; fatigue; injuries; physical exercise

## 1. Introduction

Performance markers have been used in sports science to identify, characterize, and potentiate training methodologies [1]. In soccer, the analysis of performance markers has been conducted during games by time-motion and notational analysis [2]. This analysis has indicated that soccer imposes high metabolic and physiological stress during competition, involving non-cyclical efforts over prolonged periods of time [3]. During a competitive match, soccer players may perform ~1400 short-duration maximal-intensity activities, including sprints, change of directions, tackling, accelerations, decelerations, jumps, among others [4]. Moreover, soccer players may cover up to 13-km during a match [5].

Match analysis research has extensively studied senior male players of sub-elite to elite competitive standard [6]. Senior football matches are played on pitches sized 100–110 × 64–75 m, whereas pitch size varies especially in youth football matches, with the pitch size and number of players adapted to different age groups [7]. Although there is information available regarding different formats played by soccer players of 12–17 years [8–10], research on younger players (i.e., under-12) is scarce [11,12]. Studies carried out with this age group have used friendly matches [13] and training activities, such as small-sided games [14].