

CHANGES IN AXIAL ROTATION AND ISOMETRIC FORCE AT THE KNEE JOINT IN STUDENT SWIMMERS

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The paper aims at identifying the biomechanical characteristics of passive and active internal, external axial rotation at the knee joint. Another problem was to measure the maximal isometric muscle force of rotators in the knee. The purpose of this study was to determine the differences between the knee joints of swimmers and untrained students. We anticipated changes between active and passive axial rotation and muscular strength of rotators in swimmers and students. A group of swimmers (n=20), age 21.3 \pm 65 years, body mass 79.6 \pm 5.6 kg, body height 187 \pm 7.8 cm and students (n=50) age 20.9 \pm 55 years, body mass 75.6 \pm 6.9 kg, body height 180 \pm 7.8 cm from the Academy of Physical Education in Warsaw participated in this comparative study. Our findings indicate that the passive and active internal axial rotation in swimmers' knees were significantly higher than those of students (p.< 0.05). Significant differences were also observed for passive and active external axial rotation between swimmers and students (p.< 0.05). No differences were found between the internal and external muscle force of rotators between swimmers' and students' knees (p.>0.05).

Table1. Mean [\pm Sd)] of active and passive axial rotation [$^{\circ}$]

Knee flexion angle ($^{\circ}$)	Rot. internal (swimmers)	Rot. internal (students)	Rot. external. (swimmers)	Rot.external. (students)
30 $^{\circ}$	A 28.4 \pm 11	28.4 \pm 17	39.5 \pm 3.0	32.5 \pm 12
	P. 58.4 \pm 12*	35.4 \pm 12*	68.7 \pm 15*	45.7 \pm 15*
90 $^{\circ}$	A. 31.8 \pm 9.0	29.8 \pm 12	42.3 \pm 7.0	30.3 \pm 12
	P. 59.1 \pm 9.0*	37.1 \pm 19*	71.9 \pm 13*	49.9 \pm 13*
120 $^{\circ}$	A 30.3 \pm 8.0	27.3 \pm 18	41.0 \pm 4.0	31.0 \pm 19
	P. 56.1 \pm 14*	36.1 \pm 14*	69.3 \pm 8.0*	50.3 \pm 18*

Table 2. Mean [\pm Sd] of maximal isometric force of external and internal rotatores [Nm]

Knee flexion angle ($^{\circ}$)	Rot. internal (swimmers)	Rot. internal (students)	Rot. external. (swimmers)	Rot.external. (students)
30 $^{\circ}$	58.2 \pm 12	50.2 \pm 12	50.6 \pm 16	48.6 \pm 16
90 $^{\circ}$	64.4 \pm 17	54.4 \pm 17	54.5 \pm 11	51.5 \pm 11
120 $^{\circ}$	61.6 \pm 13	53.6 \pm 13	52.3 \pm 8.0	50.3 \pm 8.0

A - active axial rotation
P.- passive axial rotation
* - p.<0.05