

## Erratum to: Female recreational athletes demonstrate different knee biomechanics from male counterparts during jumping rope and turning activities

Hidenori Tanikawa · Hideo Matsumoto · Kengo Harato · Yoshimori Kiriyaama · Yasunori Suda · Yoshiaki Toyama · Takeo Nagura

Published online: 4 June 2014  
© The Japanese Orthopaedic Association 2014

**Erratum to: J Orthop Sci (2014) 19:104–111**  
DOI 10.1007/s00776-013-0483-1

The original publication of the article includes errors in the text and tables. The contents are listed as follows:

Page 107, Section “Results”, second paragraph, second sentence should be read:

With respect to knee joint angle, female subjects displayed greater peak knee flexion angles than males when jumping rope [females  $-55.45^\circ$  (8.79°); males  $-48.1^\circ$  (8.72°)] and displayed smaller peak knee flexion angles than males when side-to-side running [females  $-55.3^\circ$  (11.67°); males  $-67.04^\circ$  (12.35°)]. The peak abduction angle was greater in female athletes than in males when jumping rope [females  $4.97^\circ$  (4.52°); males  $2.07^\circ$  (2.88°)] (Fig. 3).

Tables 2 and 3 appeared incorrectly. They are correctly shown as follows:

The online version of the original article can be found under doi:10.1007/s00776-013-0483-1.

H. Tanikawa (✉) · K. Harato · Y. Suda · Y. Toyama  
Department of Orthopedic Surgery, Keio University,  
35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan  
e-mail: anzen0126-sub@yahoo.co.jp

H. Matsumoto  
Institute for Integrated Sports Medicine, Keio University,  
35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan

Y. Kiriyaama · T. Nagura  
Department of Clinical Biomechanics, Keio University,  
35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan

**Table 2** Mean (standard deviation) of the peak knee angle in the sagittal, frontal, and transverse plane

Angle (degree)	Males	Females	P value
Jumping rope			
Flexion*	<u><math>-48.1</math> (8.72)</u>	<u><math>-55.45</math> (8.79)</u>	0.000
Abduction*	<u><math>2.07</math> (2.88)</u>	<u><math>4.97</math> (4.52)</u>	0.000
Adduction	<u><math>-0.67</math> (2.43)</u>	<u><math>0.29</math> (3.13)</u>	0.052
External rotation	<u><math>-0.61</math> (2.58)</u>	<u><math>-0.40</math> (4.89)</u>	0.750
Internal rotation	<u><math>-9.74</math> (3.12)</u>	<u><math>-10.28</math> (5.71)</u>	0.492
Backward running			
Flexion	<u><math>-44.29</math> (5.9)</u>	<u><math>-47.23</math> (7.68)</u>	0.184
Abduction	<u><math>3.22</math> (1.96)</u>	<u><math>4.64</math> (4.45)</u>	0.199
Adduction	<u><math>-1.52</math> (2.10)</u>	<u><math>-1.34</math> (4.62)</u>	0.878
External rotation	<u><math>-0.12</math> (4.15)</u>	<u><math>2.98</math> (5.24)</u>	0.045
Internal rotation	<u><math>-9.92</math> (4.03)</u>	<u><math>-9.38</math> (5.00)</u>	0.713
Side running			
Flexion	$-52.5$ (7.71)	$-51.07$ (7.62)	0.560
Abduction	$2.77$ (3.71)	$3.54$ (5.87)	0.624
Adduction	$-5.21$ (3.14)	$-5.41$ (3.62)	0.855
External rotation	$5.73$ (2.91)	$8.70$ (6.82)	0.081
Internal rotation	$-8.68$ (2.84)	$-7.47$ (4.68)	0.330
Side to side running			
Flexion*	$-67.04$ (12.35)	$-55.3$ (11.67)	0.002
Abduction	$4.30$ (3.43)	$4.02$ (6.26)	0.848
Adduction	$-3.50$ (3.35)	$-4.24$ (7.16)	0.659
External rotation	$7.01$ (7.90)	$7.18$ (5.29)	0.937
Internal rotation	$-11.56$ (2.79)	$-10.84$ (3.18)	0.424
Side to forward running			
Flexion	$-61.34$ (10.94)	$-63.34$ (11.78)	0.587
Abduction	$6.70$ (5.11)	$5.03$ (5.48)	0.329

Angle (degree)	Males	Females	<i>P</i> value
Adduction	-2.85 (4.79)	-4.07 (5.38)	0.458
External rotation	5.18 (4.89)	7.68 (9.06)	0.289
Internal rotation	-13.91 (4.93)	-12.22 (8.20)	0.439
<b>Inside turning</b>			
Flexion	45.73 (9.78)	-49.95 (5.32)	0.098
Abduction	4.29 (3.63)	4.46 (3.05)	0.872
Adduction	-8.34 (4.29)	-9.83 (5.32)	0.335
External rotation	16.87 (7.34)	22.68 (9.37)	0.035
Internal rotation	-9.42 (4.67)	-10.08 (5.24)	0.678
<b>Outside turning</b>			
Flexion	-52.12 (11.58)	-52.51 (5.54)	0.891
Abduction	6.88 (4.52)	6.79 (3.50)	0.943
Adduction	0.70 (3.28)	-0.49 (3.51)	0.279
External rotation	-0.86 (7.28)	1.62 (5.42)	0.234
Internal rotation	-14.59 (5.78)	-14.05 (5.49)	0.765

Standard deviation are noted in parentheses

The knee extension and flexion angles were noted in plus and minus value respectively

\* Indicates significant difference ( $P < 0.007$ )

**Table 3** Mean (standard deviation) of the peak knee moment in the sagittal, frontal, and transverse plane

Moment (all values in Nm kg <sup>-1</sup> m <sup>-1</sup> )	Males	Females	<i>P</i> value
<b>Jumping rope</b>			
Flexion*	1.43 (0.45)	1.81 (0.33)	0.000
Adduction	0.14 (0.13)	0.11 (0.10)	0.235
Abduction	-0.15 (0.20)	-0.09 (0.12)	<u>0.076</u>
Internal rotation	0.14 (0.13)	0.17 (0.10)	<u>0.211</u>
External rotation	-0.04 (0.07)	-0.02 (0.03)	0.040
<b>Backward running</b>			
Flexion	1.55 (0.45)	1.56 (0.38)	0.894
Adduction	0.13 (0.12)	0.14 (0.14)	0.896
Abduction	-0.24 (0.21)	-0.17 (0.19)	<u>0.260</u>
Internal rotation	0.07 (0.07)	0.11 (0.10)	<u>0.167</u>
External rotation	-0.07 (0.06)	-0.05 (0.08)	0.459

**Table 3** continued

Moment (all values in Nm kg <sup>-1</sup> m <sup>-1</sup> )	Males	Females	<i>P</i> value
<b>Side running</b>			
Flexion	1.35 (0.37)	1.64 (0.41)	0.029
Adduction	0.12 (0.13)	0.13 (0.09)	0.773
Abduction	-0.30 (0.24)	-0.14 (0.17)	<u>0.024</u>
Internal rotation	0.07 (0.09)	0.11 (0.09)	<u>0.104</u>
External rotation	-0.08 (0.08)	-0.03 (0.05)	0.041
<b>Side-to-side running</b>			
Flexion	1.29 (0.35)	1.25 (0.43)	0.740
Adduction	0.12 (0.15)	0.08 (0.10)	0.335
Abduction	-0.31 (0.11)	-0.28 (0.17)	<u>0.488</u>
Internal rotation	0.19 (0.08)	0.15 (0.06)	<u>0.121</u>
External rotation	-0.04 (0.05)	-0.03 (0.03)	0.804
<b>Side-to-forward running</b>			
Flexion	1.43 (0.28)	1.41 (0.33)	0.904
Adduction	0.16 (0.16)	0.11 (0.16)	0.386
Abduction	-0.23 (0.15)	-0.27 (0.17)	<u>0.420</u>
Internal rotation	0.15 (0.08)	0.10 (0.08)	<u>0.103</u>
External rotation	-0.06 (0.06)	-0.06 (0.06)	0.742
<b>Inside turning</b>			
Flexion	1.65 (0.48)	1.84 (0.34)	0.172
Adduction	0.11 (0.10)	0.20 (0.18)	0.053
Abduction	-0.26 (0.19)	-0.16 (0.10)	<u>0.040</u>
Internal rotation	0.11 (0.10)	0.12 (0.10)	<u>0.844</u>
External rotation	-0.08 (0.08)	-0.07 (0.07)	0.653
<b>Outside turning</b>			
Flexion	1.52 (0.48)	1.65 (0.36)	0.357
Adduction	0.22 (0.19)	0.22 (0.20)	0.923
Abduction	-0.21 (0.12)	-0.15 (0.14)	<u>0.121</u>
Internal rotation	0.14 (0.12)	0.16 (0.12)	<u>0.676</u>
External rotation	-0.04 (0.05)	-0.04 (0.05)	0.953

Standard deviation are shown in parentheses

Knee joint moments were expressed as external resultant moment in this study

\* Indicates a significant difference ( $P < 0.007$ )