

# **YOUNG ATHLETE'S KNEE INSTABILITY TREATED WITH ISOKINETIC REHABILITATION: A CASE REPORT**

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# METHODS OF MUSCLE STRENGTHENING USING RESISTANCE EXERCISES:

**ISOTONIC** exercise - adjustable speed (about 60°/sec), accommodating resistance

**ISOMETRIC** exercise - fixed speed (0°/sec); fixed resistance

**ISOKINETIC** exercise: constant speed is chosen (1-300°/sec – dynamic speed), accommodating **resistance**

- concentric muscle contractions
  - eccentric muscle contractions
- can be used

# ISOKINETICS



- used in diagnostics – reliable estimate of muscle strength
- used in rehabilitation
  - in rehabilitation of different joint injuries
  - in treatment of muscle atrophy due to joints' problems
  - in prevention of sports injuries

knee extension/flexion

hip extension/flexion  
Cybex 1000



trunk extension/flexion  
Cybex 6000

# SUBJECT

- 15-year-old rower
- bilateral knee instability accompanied with great pain
- huge muscle atrophy that required crutches
- for previous 3 years he was unsuccessfully treated with classical physical therapy

# METHODS

- upon the arrival he underwent isokinetic diagnostic testing on Cybex 1000, to precisely evaluate his muscle strength



very low muscle strength values,  
especially of the more injured left leg

- based on such exact diagnostics, specific individual protocol for isokinetic rehabilitation was developed
- he underwent 17 isokinetic treatments, actively exercising his muscles, without straining his knees

# RESULTS

## Knee extension/flexion isokinetic test

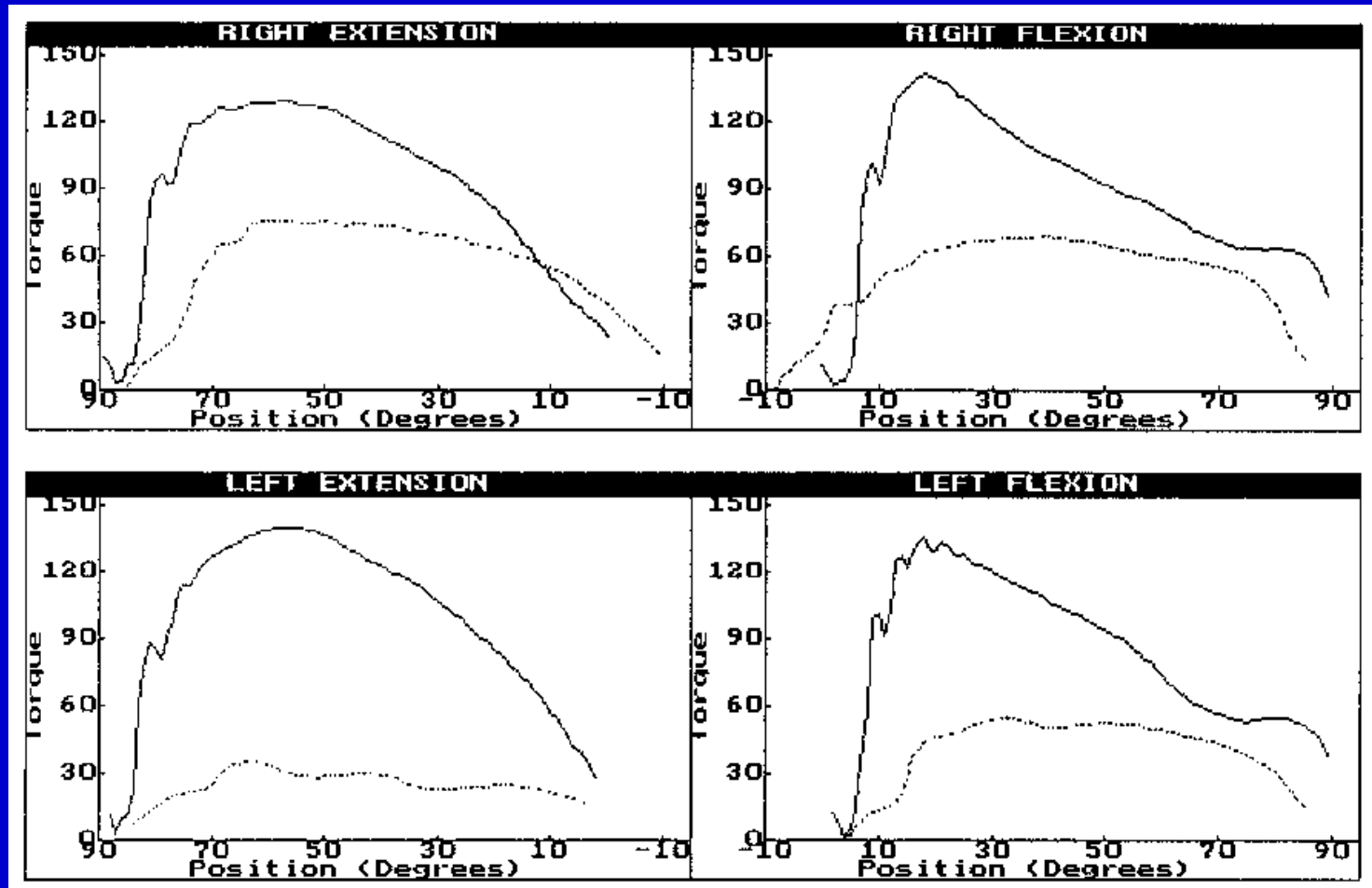


Figure 1. Dotted lines = Test1 Full lines = Test2

# Numerical values of the isokinetic diagnostic testing (comparative analysis).

	EXTENSION			FLEXION		
	Test1	Test2	Change	Test1	Test2	Change
<b>LOW SPEED TEST RESULTS</b>						
Peak Torque (Newton-Meters)						
Right:	77	123	60 %	65	136	109 %
Left:	35	141	303 %	50	129	158 %
Work Per Repetition (Joules)						
Right:	88	132	50 %	77	130	69 %
Left:	35	149	326 %	52	125	140 %
Range of Motion (degrees)						
Right:	-5	4	9 °	87	90	3 °
Left:	7	4	-3 °	86	90	4 °
<b>HIGH SPEED TEST RESULTS</b>						
Initial Peak Torque (Newton-Meters)						
Right:	53	99	87 %	52	130	150 %
Left:	33	88	167 %	27	100	270 %
Fatigue Index						
Right:	10	19	9 #	8	15	7 #
Left:	8	18	10 #	-20	5	25 #
Total Work Done (Joules)						
Right:	666	971	46 %	626	1105	77 %
Left:	434	1082	149 %	401	1067	166 %

**Table 1.** Knee extension/flexion measured at low and high speed.



# FOLLOW-UP

- at the end of rehabilitation his knees were stable and completely pain-free
- he has continued muscle strengthening using standard weight-lifting program in fitness center, and was able to resume his rowing training
- after one year, another follow-up isokinetic diagnostic testing was performed, which has shown excellent results, with further muscle strength improvement
- today (after 2 years) he doesn't have any problems with his knees, and is successfully competing in rowing

# CONCLUSION

Isokinetic rehabilitation has shown to be a very effective method in treatment of young athlete's knee instability, which was painful, long lasting and resistant to other classical physical therapy treatments.