

Rehabilitation of Running Injuries

94 - 200

Ki Un Jang, M.D.
Department of Rehabilitation Medicine
Hallym University College of Medicine Hangang Sacred Heart Hospital
E - mail : jangkiun@hanmail.net

Abstract

Running is becoming one of the most popular leisure sports. The growing popularity of running is due in part to its easy accessibility and health benefits. The incidence of running injuries ranges from 37% to 56%, which is still 2 to 6 times lower than in other sports. Most running injuries are musculoskeletal overuse syndrome of the lower extremities. The risk factors of running injuries include training errors, improper running surface, worn shoes, body flexibility, and prior injury. The knee is the most common site of injury and accounts for 25% to 33% of all, and patellofemoral stress syndrome is most commonly known as 'runner's knee'. Ilio-tibial band syndrome, medial tibial stress syndrome, plantar fasciitis, Achilles tendinitis, and stress fracture are all common injuries among runners. The process of rehabilitation is to be divided into four stages according to the athlete's level of function; the initial stage, intermediate stage, advanced stage, and final stage.

Keywords : Runner; Injury; Patelofemoral; Foot; Rehabilitation

؛ ؛ ؛ ؛ ؛

3 ~ 4

(1 ~ 4).

가

가

1

37 ~ 56%

1,000

2.5 ~ 5.8

1,000

2.5

5.8

2 ~ 6 가 2가
70% 가 (5, 8).
70% 가
1.
(overuse) 가
가 32km
(4 ~ 6). 가 5
가 1 8 (1km 5)
가 가
가 가
가 25%, 가 20%, 가 16%, 가
가 15%, 가 10%, 7%, 40 (64km)
7% 70 ~ 80% 3 가 70 (112km)
가 가 가
25 ~ 30% 가 3 ~ 4
30%,
20%, (shin splint) 15%,
15%, 10% 5
40% 가 (warm up) 32 ~ 40km 2
15%, 15%, 15%, (peak training) 72km 2
10%, 5% (4 ~ 7). (interval training), (tapering)
25%
(5, 6, 9 ~ 11).
(dirt) 가
가 가
(training error) 가 3 400km
가 30 ~ 50%

가

(Novice)

가

(4, 7, 10).

1

1.5 가 (4, 8, 10).

가

2.

1.

가 가

(excessive pronation)

(cavus)

(weekly mileage),

(current long

가 run), 6 가,

가

가

(12).

(10).

2.

가

(standing screening

test), (quick dynamic test), 가 (heel
counter)
(last)
(13, 14).
가
(tibial varus), (navicular drop) 가
(toe stand),
(heel stand), (one leg stand), 가
(single leg squat) 30 ~ 50%
(track
ing) (tuberclesulcus angle), (Patellofemoral pain syndrome),
(hamstring tightness) 가 (Iliotibial band syndrome),
(femoral tor- (Popliteal tendinitis),
sion), (tibial torsion), Q (Pes anserinus bursitis),
(patella tilt), (patella glide), (9, 10).
(anterior drawer test),
(valgus varus stress test), 1.
가
(Ober test) (runner's knee)
(subta
lar ROM), (leg- rearfoot alignment), 가
(rearfoot forefoot alignment)
(antal- gia)
(kinetic chain)
가 (vastus medi-
alis oblique)
(retinaculum), (vastus lateralis oblique)

가 20. (13, 15).
가 6
가 15cm
가
J - sign
(glide test) 20
가
(congruence angle)가 6° , 16°
(patella tilt angle)가 10° (13, 15).
가



가 , 가
가
(open chain kinetic)
가
(closed chain kinetic)

가
1. 가 (Step down exercise)

(leg press)
가

0~45
가
(trochlea)

(13).

(one leg
swing back and forward), 가 (step
down exercise)

(lunge), (wall slides),

가 .

2. (Iliotibial band standing stretching)

30.

Noble Compression test . Ober

. Modified Thomas test

가 ,

, (tensor fascia lata),



가

가

3.

(Pelvic drop exercise)

가 (step down exercise),

, 가 가 (13).

(pelvic drop exercise)

가

(2),

(foam roll)

(3)(13).

3.

30

(5, 12).

32km 가
가 , 2 (Grade 2)
1.5 ~ 3.5 3 (Grade 3)
(fracture line) 4
(fulcrum), (vibration) , (hopping)
2/3
, ' gray cortex ' 가 (20).
(triple phase bone scan) 1 (periostitis),
가 , ,
4 가 3 12
1 T2 - signal 가 (17, 19, 20).
(shin pain) 1/3 , (cavus) . 6
가가 (21).
10 ~ 15% 가
(pool running),
, 가 , , 2 10
가 4 ~ 6
, 1 2 ~ 3 , 2 4 ~ 6
(periosteal reaction) (stress , 3 6 ~ 9 , 4 12
reaction) T2 (impact activity) (cross - train
가가 , ing)
가 1 (Grade 1) . 1

					(9, 10).
1/3	,	가	(ischial bursitis)		
(20 ~ 22).			가		
4.					
	,	,	,		
가	,		(9, 10).		
	,		(Hamstring injury)		
	,	가			
가					
		(fibular			
collateral ligament)	,				
	,				
			(9, 10, 23).		
	,				
		(10, 13).			
	,	4			
			(Plantar fascitis),	(Achilles	
	,		tendinitis),		
	,				
		(10, 13).	1.		
				가	
5.			7 ~ 9%		
	,		가 9 ~ 12%		
			(heel strike)		
	,				
		가		가	
				가	



(Plantar fasciitis)



가 , 가
4. 5. 가
6
2~3
가 (4, 5)(9, 10).
2.
6.5~11%
10
(9, 10).
(shock wave),
가
(heel cup)
가
가
tendinitis) 가
(tendinosis)



3.

2 가 ,

가

가

가 .

가 .

,

,

,

가 ,

.

가 ,

(9, 10).

6.

,

2 ~ 6cm

가

4.

,

(invertor) .

가

(10, 24).

,

가 ,

.

(wall

leaning)

,

,

(friction

가 .

massage), 가 (mobilization) 가 .

가 .

가 (9, 10, 23).

(toe- up using a stair).

가

가

(6)(9, 10, 23).

가

4 가 (control abuse, modifying improper sports technique) , (resting), (initial), (control inflammation) , 1 ~ 2 가 가 BAPS RICE(rest, ice, compression, and elevation) , (Fitter) , 가 PRICEMM(Prevention, RICE, modalities, and medications) , S , 8 , Z (isome- tric), (9, 10, 13, 22). , (Pool) (9, 10, 20). 4 (Stage IV), 2 (intermediate), (Return to sports) (promote healing) , 4 ~ 6 가 (granula tion가 (pre- participation) (goal setting) (winning competition) (performance) 가가 5km 가 10 (10, 20). 1km 5 가 3 (advanced), (pre- sports), (increase fitness) 3

•

17. Bergman AG, Fredericson M, Ho C, Matheson GO. Asymp-

- automatic tibial stress reactions: MRI detection and clinical follow - up in distance runners. *Am J Roentgenol* 2004; 183: 635 - 8
18. Johnson AW, Weiss CB, Wheeler DL. Stress fractures of the femoral shaft in athletes more common than expected: A new clinical test. *Am J Sports Med* 1994; 22: 248 - 56
19. Fredericson M, Bergman AG, Matheson GO. Stress fractures in athletes. *Orthopaedic* 1997; 26: 961 - 71
20. Fredericson M, Bergman AG, Hoffman KL, Dillingham MS. Tibial stress reaction in runners: Correlation of clinical symptoms and scintigraphy with a new magnetic resonance grading system. *Am J Sports Med* 1995; 23: 472 - 81
21. Bergman AG, Fredericson M. MR imaging of stress reactions, muscle injuries, and other overuse injuries in runners. *MRI Clinics North Am* 1999; 7: 151 - 74
22. Freslon M, Soyer J, Iborra JP, Hadjadj S, Pries P, Clarac JP. An unusual cause of a stress femoral fracture in a long - distance runner: a case of bilateral fracture. *J Trauma* 2004; 56: 433 - 6
23. Hart LE. Prevention of lower limb soft tissue injuries in runners: a review. *Clin J Sport Med* 2002; 12: 320 - 1
24. Scioli MW. Achilles tendinitis. *Orthop Clin North Am* 1994; 25: 177 - 82



Peer Reviewer Commentary

()

가

가

가

. 가

()'

4 ~ 12

가 가

가