NORDIC HAMSTRING PROGRAM

Injury Prevention

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Hamstring Injury Prevention
Injury Prevention: Evidence Based Literature

- Hamstring injuries are the most common soccer-related muscle injury
  - Account for 37% of all soccer muscle injuries (Ekstrand J. et al, 2015)
- Using the Nordic Hamstring Exercise in regular training reduced hamstring injury incidence rates by 65%-70% demonstrating preventative effect in reducing recurrent injuries (Peterson J. et al, 2011)
- A random trial of using the Nordic Hamstring Exercise completed with 942 Danish soccer players resulted in:
  - 59% less new, acute hamstring injuries with the 10 week controlled group
  - Re-injury rate was 86% lower in the same group (Peterson et al, 2008)
- The peak muscle-tendinous force and strain for the hamstring muscle group occurs during the terminal swing phase, just before ground contact (Thorborg et al, 2012)
  - As a result, Thorborg et al recommended that eccentric muscle strength should be performed at longer muscle-tendinous lengths representing movements and muscle length occurring at both the knee and hip
What is the Nordic Hamstring Exercise?
Nordic Hamstring Technique Cues

- Keep ankles firmly on ground or floor
  - Suggest to place roll under ankles to reduce pressure stress applied to joint
- Keep head, trunk, hips and thighs in a straight line
- Bend from knees NOT hip or spine (knee flexion technique)
- Perform exercise slowly, under control, lowering body as far as possible towards the ground or floor
Nordic Hamstring Exercise Benefits & Support

- Evidence and research based eccentric hamstring injury prevention exercise
- Suitable for all patients and athletic abilities
- Easy instruction for effective technique
  - No heavy equipment necessary only a soft surface
  - Bodyweight and gravity acts as load
  - Slow cadence with simple controlled movement
  - May perform independently or with a partner
- Uses spine and hip extensors to stabilize trunk during exercise
- Posterior load stabilizer assisting in minimizing translation during an ACL mechanism of injury
Why use the Nordic Hamstring Exercise?

- Well evidenced as hamstring injury prevention with significant, supportive literature

- Formally introduced in 2001 finding hamstring injuries caused by strength deficits, notably eccentric strength towards end range (Mjolsnes et al, 2004)

  - English textbook from year 1880 demonstrating Swedish exercise methods...yet to be named Nordic Hamstring Exercise?

- “Old is new again” with Nordic Hamstring Curls seemingly making a return...but did it really go away?
# Recommended Frequency & Volume

- Systematic, minimal and progressive increase in volume, reps and load

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<thead>
<tr>
<th>Week</th>
<th>Sessions/Week</th>
<th>Sets</th>
<th>Reps</th>
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<tr>
<td>1</td>
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<td>5-10</td>
<td>3</td>
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<td>12, 10, 8</td>
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Source: Mjolsnes et al 2004
Minimum Recommended Reps

- **BEGINNER**
  - repetitions: 1 set (3 - 5 repetitions)

- **INTERMEDIATE**
  - repetitions: 1 set (7 - 10 repetitions)

- **ADVANCED**
  - repetitions: 1 set (minimum 12 - 15 repetitions)

Source: Mjolsnes et al 2004
Injury Prevention Protocol

- Load increases as athlete can withstand the controlled, forward fall
- Greatest eccentric benefit as hamstring muscle group lengthens closer to ground
- When able to withstand the entire range of motion for 12 reps, increase load by adding speed to the starting phase of the motion
- A partner may also increase loading further by pushing at the back of shoulders
- Add the use of elastic cords to provide support and control for proper technique to end range for beginners

Source: Mjolsnes et al 2004
Assisted Nordic Hamstring Curl
Nordbord

- Designed at University of Queensland, Australia
Youth Soccer Initiatives

- FIFA 11+ injury preventative program
- Developed by International experts from FIFA’s Medical Assessment and Research Centre (F-MARC), the Oslo Sports Trauma Research Center and the Santa Monica Orthopaedic and Sports Medicine Research Foundation
- When incorporated into team warm-up, resulted in 11.5% fewer game injuries and 25.3% less injuries during training or practice (Bizzini, M., Junge, A., Dvorak, J., 2013)

International Professional Soccer

- FCBarcelona “Muscle Injuries Clinical Guide 3.0” (January 2015)
- First edition published in 2009
- FCBarcelona and Aspetar Medical Staff
Why Not More Widely Used?

- Concern for Delayed Onset Muscle Soreness (DOMS)
  - Mjolsnes protocol progressively designed to minimize effects
- Compliance
  - Program design recommends 6-10 week training periods
- Current industry exercise approach is “functional” vs “isolation”
- Players fail to maintain proper technique and load during full active range of motion
- Cramping, dehydration a possibility?
- Differentials: fatigue, sciatic nerve (Slump Test), lumbar spine, anterior pelvic tilt, poor gluteal muscle activation...
- Open chain exercise
- Inhibition: hamstring injury rehabilitation protocols too conservative?
- Bilateral exercise rather than independent or single side exercise for muscle balance
- Does not increase concentric hamstring strength during technique
Nordic Hamstring as Rehab Exercise

“If you think hamstring exercises must be ‘functional’, be aware that data shows structure matters.”

“Examine the athlete, not the image of the injured hamstring.”

Kristian Thorborg PhD, Sports Orthopedic Research Centre - Copenhagen
Lengthening Protocol

**L-PROTOCOL**
THE LENGTHENING PROTOCOL

1. THE EXTENDER
   - twice every day
   - 3 set × 12 reps

2. THE DIVER
   - every other day
   - 3 set × 6 reps

3. THE GLIDER
   - every 3rd day
   - 3 set × 4 reps

Source: Askling et al, 2014
Preventative Muscle Activations & Stabilizers

- Opposite arm/leg raise (50% gluteus maximus activation prior to each leg lift):

- Bridging/table top with leg lift:
  (progress by extending leg on floor)
Implementation Techniques

Team or Group Applications:

- Complete during dedicated gym sessions
- Team or group circuit training combined with agility skills development or conditioning drills
- Off-day training post warm up, mobility, flexibility and fascial release/foam roller techniques
- Team or Individual off-season or LTD training programs
- Incorporate FIFA 11+ as group warm up
- Begin with only 1 session/week to a program maximum of 3 sessions/week as recommended by Mjolsnes chart
- Perform in conjunction with spine and gluteal muscle patterns for global trunk stabilization and intrinsic muscle balance
References


- FCBarcelona Muscle Injuries Clinical Guide 3.0; January 2015 in collaboration with Aspetar Medical Staff


Thank you