Injuries in Racket sports

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6th World Congress of Racket Sport Science
Introduction

• Sport injuries in Scandinavia: 10-19% of all severe injuries in ER

• Common sports injuries: Knee and ankle injuries

• Common racket sports injuries: Shoulder, elbow and lower extremities

INJURIES

- Head and Face injury
- Fracture/Ligament/Joint dislocation
- Rotator cuff/SLAP/Shoulder instability/Tendinitis/Biceps
- Fracture/dislocation/Tennis elbow/

Injuries

- Runner hip
- Femoral Stress fx
- ACL, Meniscus injury
- Runner knee
- Calf injury
- Ankle sprain
- Hamstring injury
- IT band syndrome
- Tibial stress fracture
- Foot and ankle stress fx
- Achilles tendon injury
- Plantar fasciitis
Failure Mode of injury

Over Ultimate Tensile Strength (1/3)

Fatigue Failure Or Overuse (2/3)
### Etiology of acute injury

<table>
<thead>
<tr>
<th>Movement Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turning/changing direction/shifting weight/pivot/twist</td>
<td>34%</td>
</tr>
<tr>
<td>Movement/running/moving sideways or backwards</td>
<td>22%</td>
</tr>
<tr>
<td>Lunge/pushing off/reaching</td>
<td>11%</td>
</tr>
<tr>
<td>Landing/jump and land</td>
<td>7%</td>
</tr>
</tbody>
</table>

Joanna Reeves. A Retrospective Review from 2006 to 2011 of Lower Extremity Injuries in Badminton in New Zealand Sports 2015, 3, 77-86
RISK FACTORS

Extrinsic risk factors

Intrinsic risk factors

Volume of play
Higher if > 3hrs/week

Lower Extremities alignment

Gender, Age

High BMI

Racquet grip position
Ulnar side injury → western or semi western
Radial side injury → Eastern grip


World ranking tennis player came to us with a problem of wrist pain after a tennis game.

Physical exam revealed slightly tender over his hand

No obvious deformity
Case Study (example images)
Case Study

• **Problem**
• When should he return to play?
• Is this the end of his career?
• As a caregiver what is the best plan for him?
Decision making

- Many factors
- Age
- Degree of performance
- Medical comorbidities
- Cosmetic
- Associated conditions
Case I (shoulder dislocate)

- **Recurrent Shoulder dislocation (20 times)**
  - The patient had hyperlaxity of his shoulder.
  - Higher motion
  - More prone to injuries

- **In case of surgery**
  - Stiffness may occur
  - Decrease in performance
Case II (Senior player with meniscus injury)

- A 64-year-old badminton player
- Suffer from knee pain after falling
- He wants to go back and play badminton at the previous level

Medial Meniscal root injury and early osteoarthritis
Biologic healing

- ACL reconstruction – tendon to bone healing or bone to bone healing
- Fracture – duration of bone healing
- Muscle and tendon injury

Depend on type of injuries
Anatomic abnormalities that lead to injury

Movement pattern
Functional Recovery

Subjective

Time Frame

Objective
Functional Recovery: Subjective

2000 IKDC SUBJECTIVE KNEE EVALUATION FORM (POSTOP)

SYMPTOMS:
*Grade symptoms at the highest activity level at which you think you could function without significant symptoms, even if you are not actually performing activities at this level.

1. What is the highest level of activity that you can perform without significant knee pain?
   - Very strenuous activities like jumping or pivoting as in basketball or soccer
   - Strenuous activities like heavy physical work, skiing or tennis
   - Moderate activities like moderate physical work, running or jogging
   - Light activities like walking, housework or yard work
   - Unable to perform any of the above activities due to knee pain

2. During the past 4 weeks, or since your surgery, how often have you had pain?
   - Never
   - Almost never
   - Rarely
   -偶尔
   - Sometimes
   - Often
   - Very
   - Extremely
   - Constant

3. If you have pain, how severe is it?
   - No pain
   - Mild
   - Moderate
   - Severe
   - Very
   - Extreme
   - Worst pain imaginable

4. During the past 4 weeks, or since your surgery, how stiff or swollen was your knee?
   - Not at all
   - Slightly
   - Slightly
   - Moderately
   - Severely
   - Extremely

5. What is the highest level of activity you can perform without significant swelling in your knee?
   - Very strenuous activities like jumping or pivoting as in basketball or soccer
   - Strenuous activities like heavy physical work, skiing or tennis
   - Moderate activities like moderate physical work, running or jogging
   - Light activities like walking, housework or yard work
   - Unable to perform any of the above activities due to knee swelling

6. During the past 4 weeks, or since your surgery, did your knee lock or catch?
   - Yes
   - No

SPORTS ACTIVITIES:
7. What is the highest level of activity you can perform without significant giving way in your knee?
   - Very strenuous activities like jumping or pivoting as in basketball or soccer
   - Strenuous activities like heavy physical work, skiing or tennis
   - Moderate activities like moderate physical work, running or jogging
   - Light activities like walking, housework or yard work
   - Unable to perform any of the above activities due to giving way of the knee

8. What is the highest level of activity you can participate in on a regular basis?
   - Very strenuous activities like jumping or pivoting as in basketball or soccer
   - Strenuous activities like heavy physical work, skiing or tennis
   - Moderate activities like moderate physical work, running or jogging
   - Light activities like walking, housework or yard work
   - Unable to perform any of the above activities due to knee pain

5. How does your knee affect your ability to:
   - Go up stairs
   - Go down stairs
   - Kneel on the front of your knee
   - Squat
   - Sit with your knee bent
   - Rise from a chair
   - Run straight ahead
   - Sit and stand on your involved leg
   - Stop and start quickly

FUNCTION:
10. How would you rate the function of your knee on a scale of 0 to 10 with 10 being normal, excellent function and 0 being the inability to perform any of your usual daily activities which may include sports:
   - Cannot perform daily activities
   - Cannot perform daily activities

CURRENT FUNCTION OF YOUR KNEE:
Functional Recovery: Objective

Testing
Most common (ACL – Rothman)
  Muscle strength (cybex)
  Hop tests (Range 1-4)
  Sports specific/agility

Physical Examination
  No effusion
  Negative Lachman
  ROM

Hop Test

HOP TEST

CYBEX

www.youtube.com
Psychological

- I think your mind is really the key. (Michael Phelps)

Worrying gets you nowhere. If you turn up worrying about how you’re going to perform, you’ve already lost. Train hard, turn up, run your best and the rest will take care of itself.

— Usain Bolt —

“I won’t predict anything historic. But nothing is impossible.”

— Michael Phelps Quotes —

“Endure, put up with whatever comes your way, learn to overcome weakness and pain, push yourself to breaking point but never cave in. If you don’t learn that lesson, you’ll never succeed as an elite athlete.”

— Rafael Nadal — fearlessmotivation.com
Psychological


Fear of injury

Physiological
- Muscular
  - Specific guarding/bracing
  - Generalized tension
- Autonomic
  - Increased heart rate
  - Neurochemical changes

Performance
- Disruption of biomechanics of skill execution
- Poor use of energy resources
- Decreased attention to performance-related cues
- Increase in injury risk

Psychological
- Skill-based
  - Decreased concentration
- Interpretive
  - Increased distractibility
  - Decreased self-confidence
  - Increased pain awareness
Psychological

Methods for Assessing Psychological Readiness to Return

- Questionnaire
  - Creighton and colleagues
  - 3-step return-to-competition decision-making model
  - the Injury Psychological Readiness to Return to Sport Scale (I-PRRS) 2009

Step 1: Assess medical factors
- Step 2: Risks in sport played
- Step 3: Decision making

EXAMPLE

- Lose in World Championship 2003 and Olympic 2004
- He had disturbing shoulder injury.
- He decided to do shoulder surgery.
Silver in Asian game 2006
Gold in Olympics 2008
Behind The Scene
“NO DEFINITE CUT POINT Criterions”
Surveyed 10 ACL experts
• 8 orthopaedic surgeons
• 2 therapists specializing in ACL rehab
• Rank all criteria for importance (1-5)
• Highest scores kept
• Lowest scores deleted from checklist
CRITERIA FOR RETURN-TO-PLAY

1. No or minimal effusion, full ROM, no instability
   - PASS  |  FAIL
2. Thigh circumference < 1.5 cm difference
   - PASS  |  FAIL
3. IKDC ≥ 90%
   - PASS  |  FAIL
4. FMS ≥ 14
   - PASS  |  FAIL
5. LSI ≥ 90% for all 4 hop tests
   - PASS  |  FAIL
6. Pro agility ≥ 90%
   - PASS  |  FAIL
7. Movement assessment ≥ 80%
   - PASS  |  FAIL

NOTES: _____________________________________________________________

• One hour to complete
  • All ACLs 6-9 months post-op
  • Must pass all movement assessments to pass
  • If fail, additional PT for 6 weeks and re-test
CASE I (SHOULDER DISLOCATE)
CASE II (SENIOR PLAYER WITH MENISCUS INJURY)
Case II (Senior player with meniscus injury)

Technical Note

Arthroscopic Medial Meniscus Root Repair With Soft Suture Anchor Without Posterior Portal Technique

Somsak Kuptniratsaikul, M.D., Thun Itthipanichpong, M.D., and Vanasiri Kuptniratsaikul, M.D.

Abstract: Medial meniscal root injury is known to cause an increase in tibiofemoral contact pressure and results in early osteoarthritis. There have been many reports on meniscal root repairing techniques, which can be categorized into 2 groups. One is transosseous suture, and the other is anchor suture repair. Both techniques show improvement in not only clinical performance, but also radiographic finding. However, the meniscal root repair procedure must be performed by experienced physicians. Most techniques require a posteromedial portal, which takes time and may even complicate the procedure. The technique proposed in this study provides a simple procedure in which no posteromedial portal is required and a soft anchor suture, a commonly used suture in glenolabral repair, is used. The use of this suture, instead of the conventional anchor suture, is believed to lessen possible injury to the cartilage and results in easier revision surgery.

The patient is pain free now.

He has returned to light play sport since last visit.

Kuptniratsaikul S., Itthipanichpong T, Kuptniratsaikul V. Arthros Tech. 2018
CONCLUSION

What's the CONCLUSION?

- Racket sport injuries
- Individualization
- Need biologic, biomechanics, functional evaluation, and psychological evaluation
- Gradual return is important
Thank you