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## Evidence based treatment + prevention of ankle sprains



Sports, Lifestyle and Health research group  
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WC Hockey 2014

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## I am

- Recreational athlete
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## Evidence based treatment (+ prevention) of ankle sprains



- Round 1: intro + Quiz
- Round 2: EB treatment
- Round 3: EB prevention
- Round 4: discussion

\*Waterman: The Epidemiology of Ankle Sprains in the US, JBJS 2010

## Round 1: Introduction

- 50% of all ankle sprains occur during sports\*:
  1. Basketball, 41.1%
  2. American Football, 9.3%
  3. Soccer, 7.9%
  4. Running, 7.2%



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## Introduction 2

- 770.000 ankle injuries /year in the Netherlands
  - 28% soccer
  - 15% running
  - 13% school
- 60-80% are lateral ankle sprains
- About 35% are medically treated
- Costs: €175 million annually

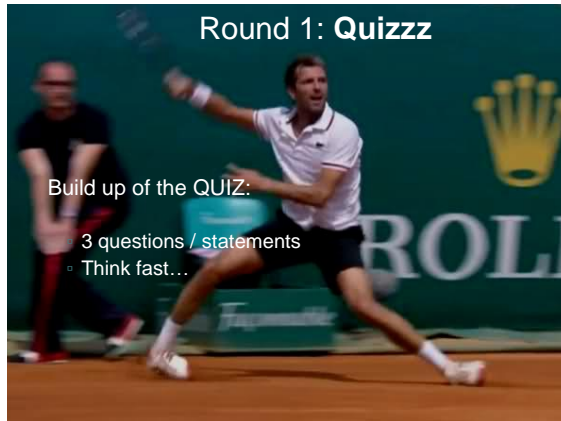
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## Introduction 3

- High risk of recurrence (RR 2 in first year) \*
- 20-50% recurrent ankle sprains lead to:
  - Chronic pain\*\*
  - Instability\*\*
  - Eventually osteoarthritis\*\*\*



\* Ekstrand et al 1990, Milgrom et al 1991, Bahr et al 1997  
\*\* Yung et al 1994, Braun 1999  
\*\*\* Sugimoto et al 2009



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1. How many percent of Dutch recreational soccer players have sustained at least one ankle sprain during their active soccer career?

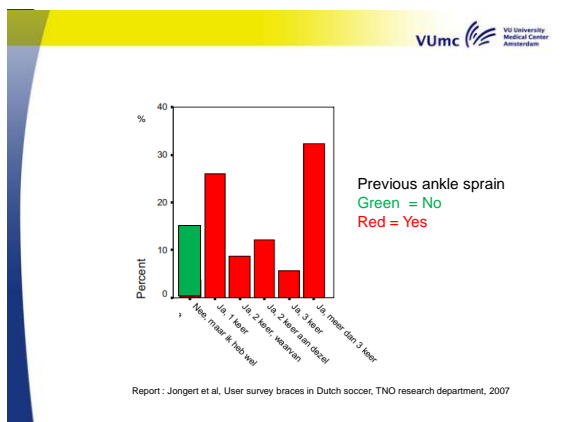
A. 35%  
 B. 50%  
 C. 85%  
 D. 100%

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1

- How many percent of Dutch recreational soccer players have sustained at least one ankle sprain during their active soccer career?
  - A. 35%
  - B. 50%
  - C. **85%**
  - D. 100%

Jongert, M, et al. 'User survey braces in Dutch soccer' Report TNO research department, 2007



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2. Taping is approximately three times more costly than bracing for the prevention of ankle sprains

A. True  
 B. False

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2

- Taping is approximately three times more costly than bracing for prevention of ankle sprains
  - A. **True**
  - B. False

Olmsted LC, et al. Prophylactic Ankle Taping and Bracing: A Numbers-Needed-to-Treat and Cost-Benefit Analysis. J Athl Train. 2004 Mar;39(1):95-100.



Intervention	NNT history of ankle sprain	NNT <u>NO</u> history of ankle sprain
<b>Tape</b>	Garrick and Requa = 26	Garrick and Requa = 143
<b>Brace</b>	Stiler, et al = 18 Surve, et al = 5	Stiler, et al = 39 Surve, et al = 57

3. An eight week home-based balance board training program reduces ankle sprain recurrence risk by 35%

- A. True
- B. False



3

- An eight week home-based balance board training program reduces ankle sprain recurrence risk by 35%

- A. True
- B. False

Hupperets MD, et al. **'Effect of unsupervised home based proprioceptive training on recurrences of ankle sprain: randomised controlled trial.'** Brnj. 2009;339:b2684.



Round 2: EBM treatment

## Treatment

- RICE, PRICE or POLICE?
- Protection
- Optimal Loading
- Ice
- Compression
- Elevation

Downloaded from [jgms.jama.com](http://jgms.jama.com) on May 3, 2014. Published by [jgms.jama.com](http://jgms.jama.com)

**Consensus statement**

### Diagnosis, treatment and prevention of ankle sprains: an evidence-based clinical guideline

Gino M Kerkhoffs,<sup>1</sup> Michel van den Bekerom,<sup>2</sup> Leon A M Elders,<sup>3</sup> Peter A van Beek,<sup>4</sup> Wim A M Hullegie,<sup>5</sup> Guus M F M Bloemers,<sup>6</sup> Ely M de Heus,<sup>7</sup> Masja C M Loogman,<sup>8</sup> Kitty C J G M Rosenbrand,<sup>9</sup> Ton Kuipers,<sup>10</sup> J W A P Heugstraten,<sup>11</sup> Pieter Dekker,<sup>12</sup> Henk-Jan ten Dijke,<sup>13</sup> C Niek van Dijk,<sup>14</sup> Maurits W van Tulder,<sup>15</sup> Philip J van der Wees,<sup>16</sup> Rob A de Bie<sup>16</sup>

**Target group**  
The guideline is meant for all care providers who are involved in the treatment and guidance of patients with ankle sprains. Family physicians, physical therapists, chiropractors, surgeons, trauma surgeons, orthopedists, physicians, radiologists, occupational physicians, sports physicians and professionals involved in sport medicine.

**MATERIALS AND METHODS**  
The recommendations in this guideline are, if available, based on evidence from published scientific research. Relevant articles were searched in the Cochrane Library, Medline and Embase. The full search strategy is available upon request. The language was limited to Dutch, English, German, French, Italian,

**ABSTRACT**  
Ankle sprains are a huge medical and socioeconomic problem. Many people have a traumatic injury of the ankle, most of which are a result of sports. Total costs of treatment and work absenteeism due to ankle sprains

and physical therapists and other involved professional groups and to define the framework within which the multidisciplinary care of patients with ankle sprains has to take place. This guideline will also contribute to improved communication between healthcare professionals.

functional-torsion ligament rupture is two and a half weeks and after six weeks, 90% has returned to work. Of the patients who perform sports, around 40-60% resume sports after 12 weeks at the same level as before the trauma. About one-third

## Methods

- Goal of clinical guideline:  
prevention of further health impairment (ie, recurrences) by recommending improved diagnostic and therapeutic opportunities
  - Target group: the guideline is meant for all care providers
  - SEARCH: Cochrane Library, Medline and Embase
  - Between 1996 and March 2009

## Results: treatment

- Inflammatory fase
  - Intermittent application of ice more effective on short term pain reduction than standard icing
  - 1 RCT: 10 days of plaster immobilisation or rigid support for reduction of pain and swelling can still be considered

- Functional treatment (9 RCTs, N=892)
  - Elastic bandages gave fewer complications than tape, but was associated with a delayed return to work and sports
  - Lace-up brace or semi-rigid brace seems preferable to the use of an elastic bandage (level 2)
  - Exercise therapy seems to prevent a recurrence in patients with LAI (2 RCTs, n=130) (RR 0.37; 95% 0.18 to 0.74) on the long term (8 to 12 months) (Level 2)

- Manual mobilisation (3 RCT's)
  - There are limited positive (very) short-term effects (dorsal flexion, ROM, proprioception) in favour of manual mobilisation of the ankle (Level 2).
  - However, the clinical relevance of these findings is limited since the effects had disappeared 2 weeks after injury.

- Other therapies
  - **Ultrasound, laser therapy and electrotherapy**



- Surgery
  - limited evidence for longer recovery times, and higher incidences of ankle stiffness, impaired ankle mobility and complications after surgical treatment (20 RCTs, N=2562) (Level 2).
  - However, final conclusion from this review was that there are insufficient high-quality RCTs
  - Based on consensus in the committee, it is recommended that in (top-professional) sports surgical treatment can be considered

## Prevention

- Exercise therapy
  - The results of two RCTs and two systematic reviews suggest that training coordination and balance does prevent recurrence of ankle injuries in athletes up to 12 months postinjury (Level 2)
  - Exercise therapy should be included as much as possible into regular training activities or at home to prevent recurrences or both.

## Prevention

- Tape/brace
  - The results from three systematic reviews suggest that the use of a brace and tape reduces the risk of recurrent inversion injuries in those who are active in sports (Level 2) (5 RCTs, N=2858) (RR 0.53, 95% CI 0.40 to 0.69).
  - On the basis of practical usability and evaluation of costs, a brace is initially the preferable means of support.

## Round 3:

### Braces versus neuromuscular training for the prevention of ankle sprain recurrences a randomised controlled trial



'brace vs balance board'

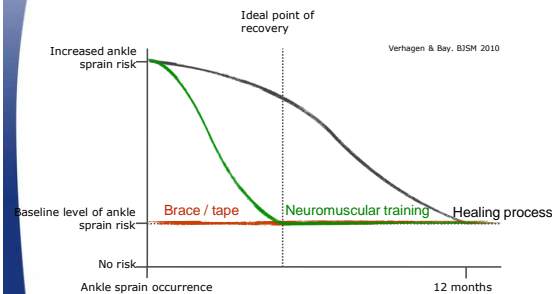
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Dept of Public and Occupational Health EMGO Institute for Health and Care Research  
VU University Medical Center  
[www.slihamsterdam.com](http://www.slihamsterdam.com)

## Prevention: practice

- Higher relative risk of recurrent ankle sprain even after (para) medical treatment
- MD guideline (2012) advises preventive measures:
  - Neuromuscular(NM) training\*
  - Tape / Sportsbrace

\* Hupperets et al 2009 BMJ  
\*\* Kerkhoffs et al 2012 AJSM

When and how?

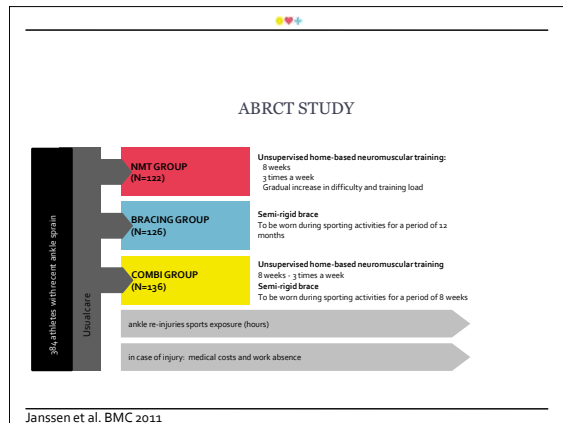


### Study aim:



'brace vs balance board'

To evaluate the effectiveness of combined bracing and neuromuscular training, or bracing alone, against the use of neuromuscular training on recurrences of ankle sprain after usual care in athletes following an acute injury to the lateral ankle ligaments



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## Intervention group 1

One-legged knee flexion    Toe stand    One-legged stance

Runners pose    Crossed leg-sway    Toe walk

**3 sessions weekly, 20 min. per session, for 8 weeks**

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## Intervention group 2

- DJO Aircast A60
- Specifically designed for sports
- Semi rigid
- Easy in use

**Worn during sports participation for 12 months**

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## Intervention group 3

**neuromuscular training for 8 weeks    +    brace worn during sports for 8 weeks**

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## follow-up

- 12 months
  - Monthly web-based questionnaire
  - Registration of ...
  - Recurrent sprains / other injuries
  - Compliance with the intervention
  - In case of recurrent sprain, cost diary
- Primary outcome measure
  - Incidence of ankle sprains

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## Study population

Mean at baseline	NM Training	Sports Brace	Combination
Age in years (SD)	34 (13)	35 (12)	34 (14)
Height in cm's (SD)	178 (10)	179 (9)	179 (11)
Weight in kg's (SD)	77 (14)	75 (12)	76 (12)
% Male	49 %	44 %	47 %
% Contact sports	60 %	58 %	50 %
% Higher educated	52 %	58 %	57 %

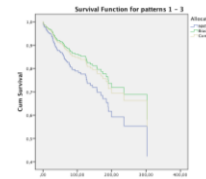
\*There were no significant differences in mean baseline characteristics between groups

## Injury risk

	NM Training	Sports Brace	Combination
Excluded	15	13	16
Started intervention (n)	107	113	120
Lost to follow-up	5	10	7
Recurrent sprains	29	17	23
Injury Risk	27%	15%	19%

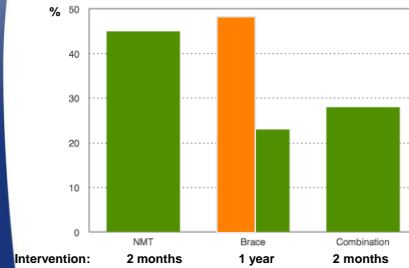
## Survival analysis recurrent sprains

	RRisk	95% CI	
		lower	upper
NMT	1	-	-
Brace	0.53	0.29	0.97
Combi	0.66	0.37	1.15



Brace beats Balance Board!

## Compliance



Intervention: NMT 2 months, Brace 1 year, Combination 2 months

## Open access results

BJSM Online First, published on January 7, 2014 as 10.1136/bjsports-2013-029417 Original article



### Bracing superior to neuromuscular training for the prevention of self-reported recurrent ankle sprains: a three-arm randomised controlled trial

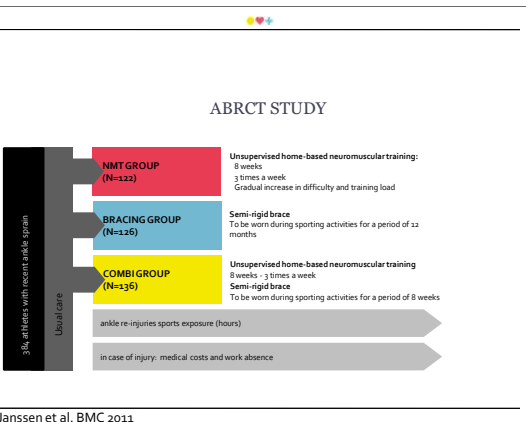
Kasper W. Janssen,<sup>1,2</sup> Willem van Mechelen,<sup>1</sup> Evert A. L. M. Verhagen<sup>1</sup>

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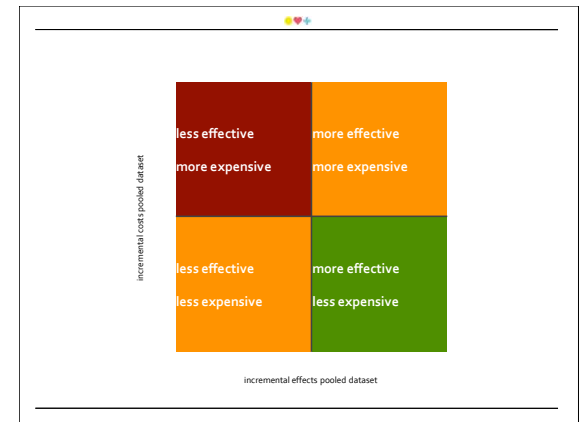
<sup>2</sup>Department of Sports and Exercise Medicine, Sports Medical Centre (SMC), Vrije Universiteit, The Netherlands

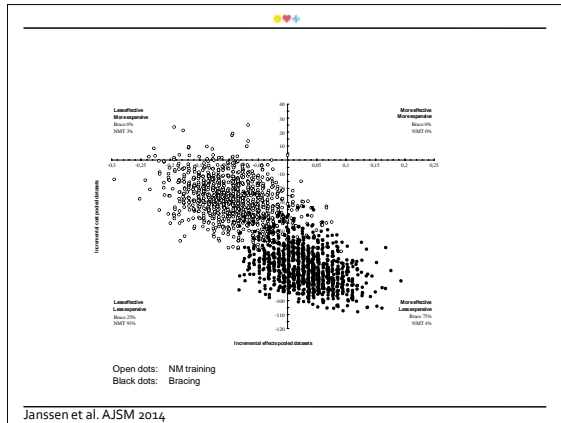
**ABSTRACT** Background Ankle sprain is the most common sports-related injury with a high rate of recurrence and associated costs. Recent studies have emphasized the effectiveness of both neuromuscular training and bracing for the secondary prevention of ankle sprains. Aim To evaluate the effectiveness of combined bracing and neuromuscular training, or bracing alone, against the use of neuromuscular training on recurrences of ankle sprain after usual care.

**POSTERS** Recurrent sprains may cause anterior ankle impingement, peroneal tendon pathology, chronic ankle instability and eventually osteoarthritis, requiring prolonged medical care.<sup>1-3</sup> The increased ankle sprain recurrence risk exists even after completion of medical treatment.<sup>4-7</sup> Therefore, advocating secondary preventive measures after usual care is recommended,<sup>8</sup> and may have a significant and important impact on a patient's health and physical activity participation.<sup>9</sup>



Janssen et al. BMC 2011






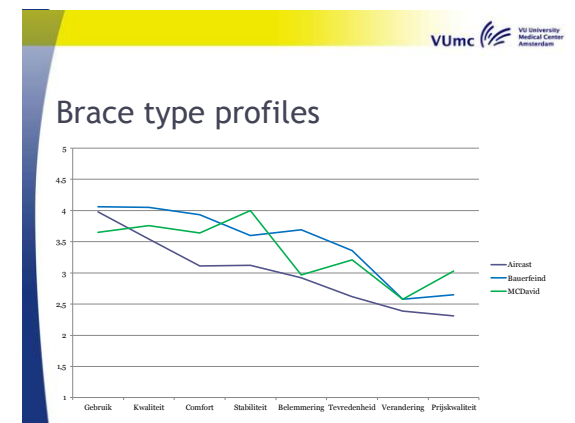
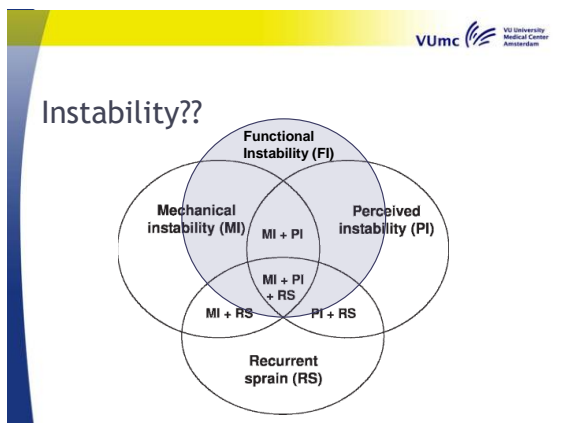
### Round up: So what? Or, so why?

- Braces are (cost)effective!
- So, why don't athletes use them?!
  - Wrong beliefs in athletes/coaches/paramedics
  - Individual motivation
  - Comfort/user friendliness
  - Specialists are unfamiliar with tailored prescription

### Round 4: Discussion



- Round 1: intro + Quiz
- Round 2: EB treatment
- Round 3: EB prevention
- Round 4: discussion






## Take home: to brace!

- **‘What brace do I advise to whom for how long?’**
  - Evidence for semi-rigid brace and lace-up brace
    - In the future also for compression?
  - Prescribe ankle brace for at least 6 months, but be pragmatic
  - Life long prescription in high risk sport / chronic instability

## Compliance = key

- **How can I make my patients compliant?**
  - discuss prejudices
  - give explanation and assistance in brace selection
  - apply shared decision making
  - **be an ankle brace specialist!**
    - or refer to one ;)

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**SPORTS LIFESTYLE HEALTH**

HOME PROJECTS PUBLICATIONS ANKLE APP

**PUBLICATIONS**

04/10/2024

We are a research group within the Department of Public and Occupational Health at the VU University Medical Center in Amsterdam, the Netherlands. Our research deals with the relationship between physical activity and health. Sufficient levels of physical activity are a necessity for good health, but also entail a risk of injury. Through this website we will keep you updated on our own research and others who deal with these topics.



**BRACING SUPERIOR TO NEUROMUSCULAR TRAINING?!**

Ankle sprain is the most common sports-related injury with a high rate of recurrence and associated costs. Recent studies have emphasized the effectiveness of both neuromuscular training and bracing for the secondary prevention of ankle sprains. This new study evaluated the effectiveness of combined bracing and neuromuscular training, in bracing alone, against the use of neuromuscular training on recurrences of ankle sprain after casual care.

**Thank you!**

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