

# Muskelverletzungen im Profifußball

Dr. Christian Klein  
VBG Wissenschaftskoordinator Sport

Präventionssymposium Fußball | Volksparkstadion  
Hamburg, 5. April 2025



# Verletzungsmonitoring – Der VBG-Sportreport

1. und 2. Bundesliga Männer Basketball



## Injury analysis

Injuries in the 2 seasons (period) were examined

All insured even (treatment and ration) paid by incapacity for work

We counted the analysis. Some accidents injuries.

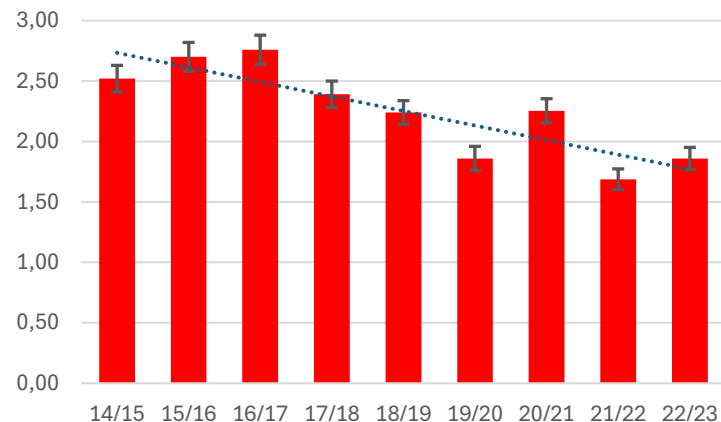
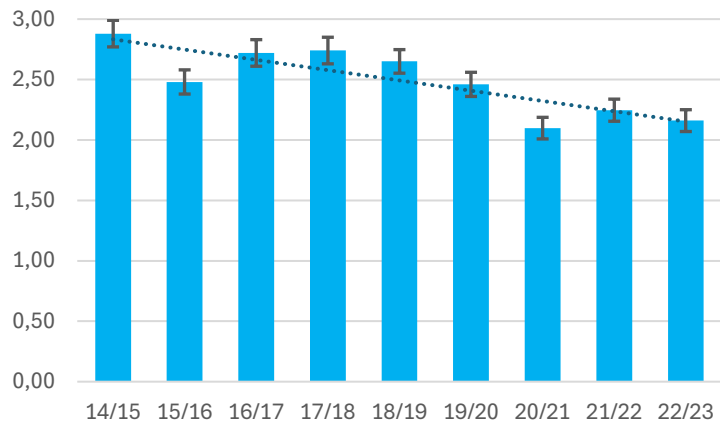
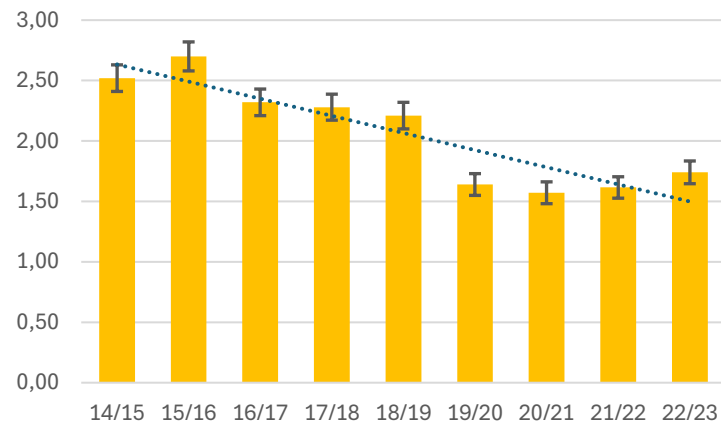
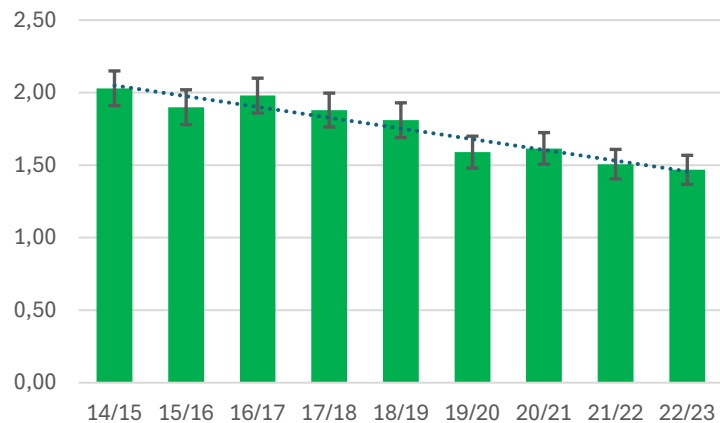
## Analysis of the causes of injury

Rate and severe competitive injuries in an incapacity for work of seven or more and/or benefits of EUR 1,000 or more paid by the VBG were taken account of the systematic video analysis of the causes of injury, insofar as they could be identified in video material.

## Video population

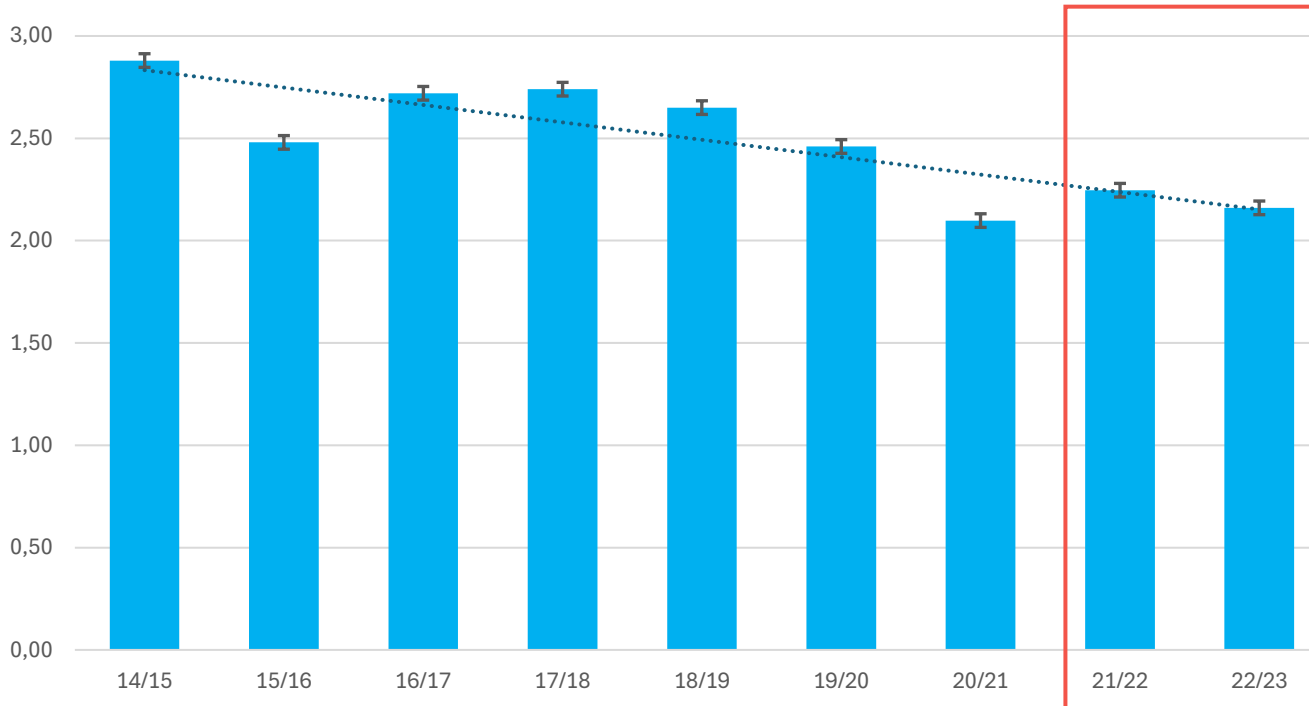
Data as of 08/2018) Recorded variables: including place and time of the injury, match situation, movement patterns, match situation, injury mechanism, cause of injury

59.939



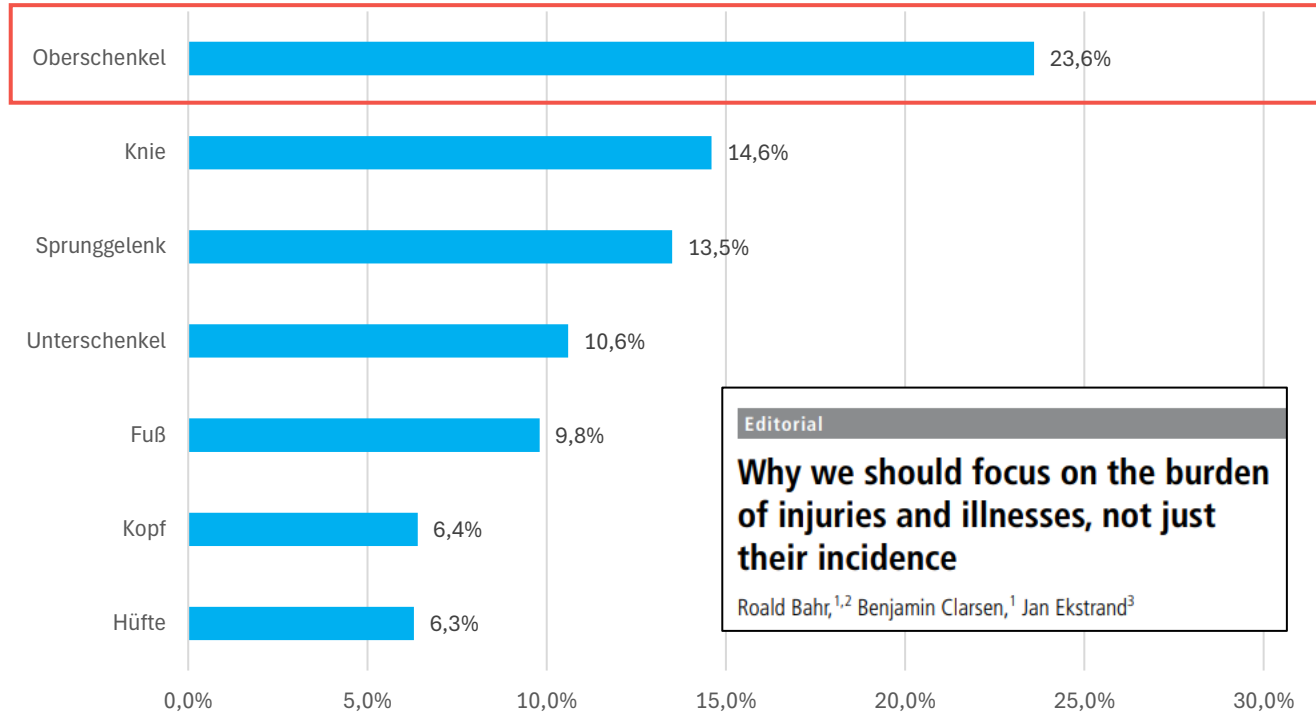
# Kumulative Saisoninzidenzen im Fußball

Längsschnittbetrachtung über neun aufeinanderfolgende Saisons (n = 21.469 Verletzungen;  $\pm 95\%$  KI)



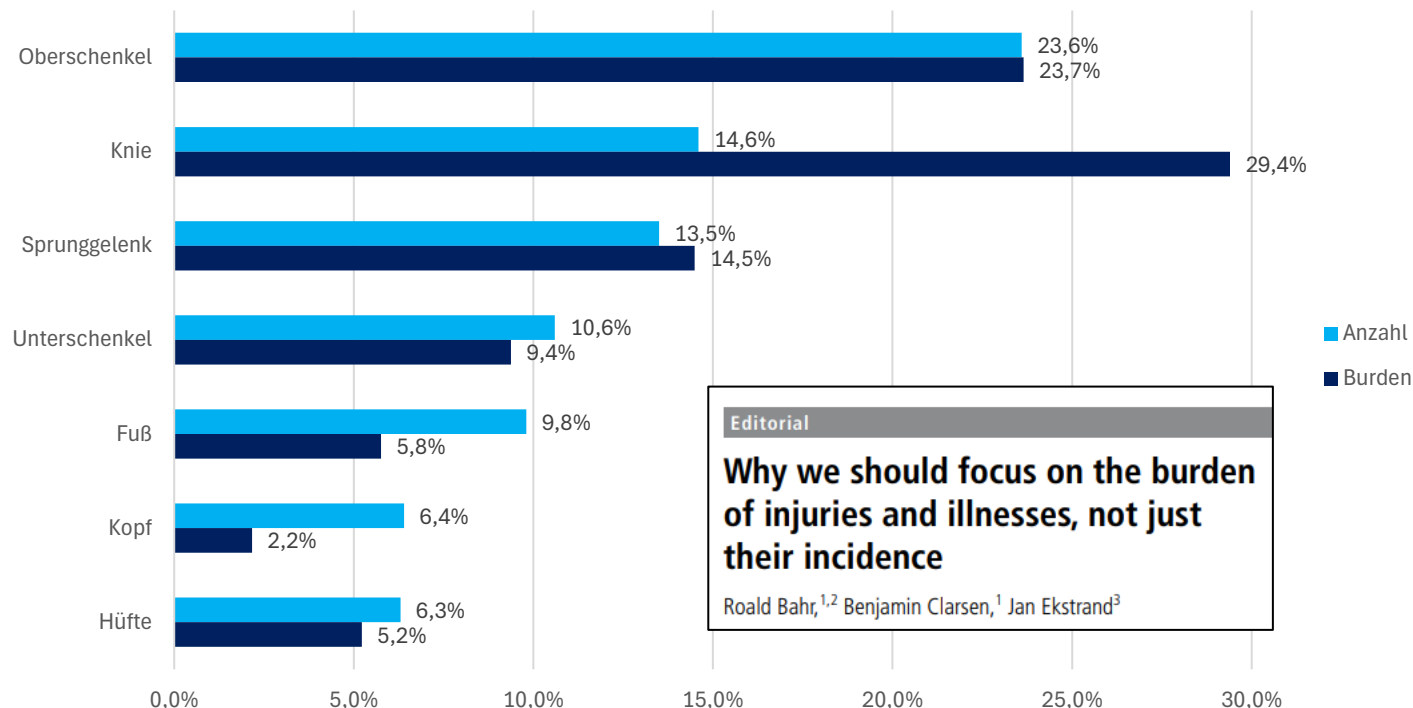
# Betroffene Körperregionen

Bundesliga und 2. Bundesliga 2014 - 2023, n = 21.469 Verletzungen



# Betroffene Körperregionen und Ausfallzeiten

Bundesliga und 2. Bundesliga 2014 - 2023, n = 21.469 Verletzungen



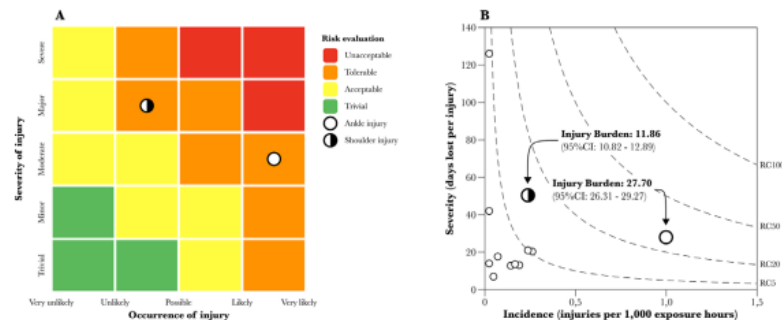
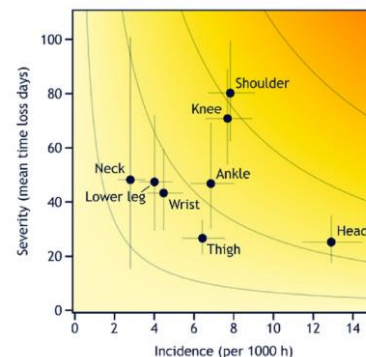


## International Olympic Committee consensus statement: methods for recording and reporting of epidemiological data on injury and illness in sport 2020 (including STROBE Extension for Sport Injury and Illness Surveillance (STROBE-SIIS))

Roald Bahr<sup>1,2</sup>, Ben Clarsen<sup>3</sup>, Wayne Derman<sup>4</sup>, Jiri Dvorak<sup>5</sup>, Carolyn A Emery<sup>6,7</sup>, Caroline F Finch<sup>8</sup>, Martin Häggglund<sup>9</sup>, Astrid Junge<sup>10,11</sup>, Simon Kemp<sup>12,13</sup>, Karim M Khan<sup>14,15</sup>, Stephen W Marshall<sup>16</sup>, Willem Meeuwisse<sup>17,18</sup>, Margo Mountjoy<sup>19,20</sup>, John W Orchard<sup>21</sup>, Babette Pluim<sup>22,23,24</sup>, Kenneth L Quarrie<sup>25,26</sup>, Bruce Reider<sup>27</sup>, Martin Schwellnus<sup>28</sup>, Torbjørn Soligard<sup>29,30</sup>, Keith A Stokes<sup>31,32</sup>, Toomas Timpka<sup>33,34</sup>, Evert Verhagen<sup>35</sup>, Abhinav Bindra<sup>36</sup>, Richard Budgett<sup>29</sup>, Lars Engebretsen<sup>1,29</sup>, Uğur Erdener<sup>29</sup>, Karim Chamari<sup>37</sup>

## Do not neglect injury severity and burden when assessing the effect of sports injury prevention interventions: time to paint the whole picture

Evert Verhagen<sup>10</sup>, Ben Clarsen<sup>2,3</sup>, Larisa van der Graaff<sup>1</sup>, Roald Bahr<sup>10,2,4</sup>

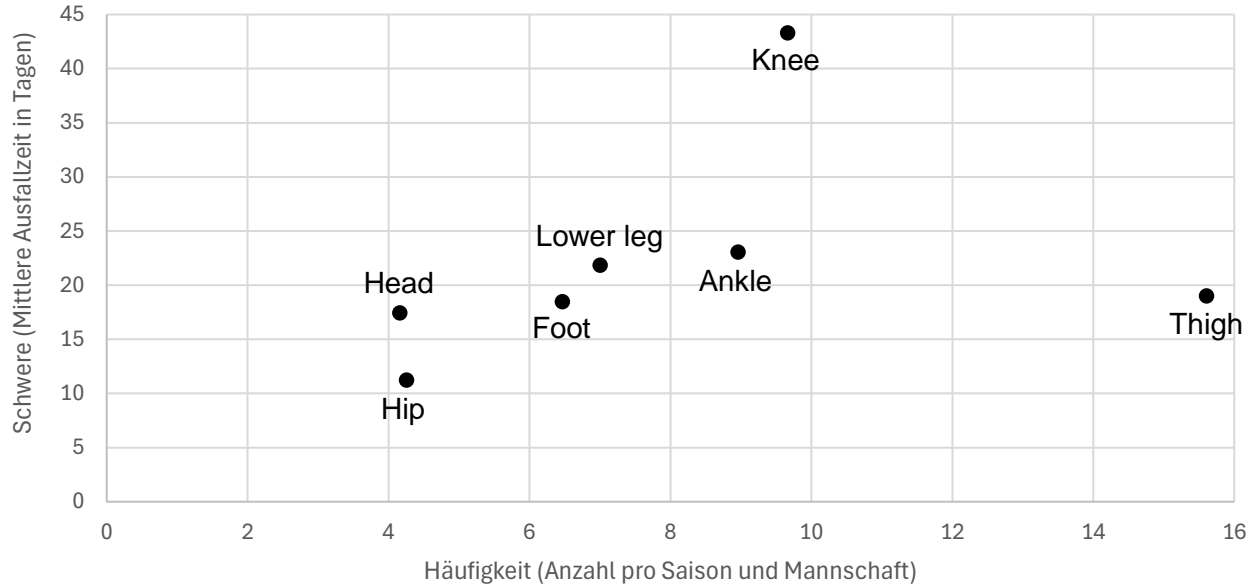


**Figure 1** Risk matrices for injuries in recreational volleyball players, recalculated from the original data of Verhagen *et al.*<sup>7</sup> (A, B) The injury frequency is considered on the x-axis, and on the y-axis, the injury's severity. On the left (A) presents a simplified risk matrix based on a qualitative categorisation,<sup>2</sup> whereas (B) presents the risk matrix based on quantitative data.<sup>1</sup> In (B) the product of both axes is the injury burden, that is, the number of days lost per 1000 hours of exposure. The dotted lines present the 'Risk Contour' along which the injury incidence and severity combinations have an injury burden equal to the corresponding number, for example, RC20 is the line along which the injury burden is 20 days of time-loss per 1000 hours of exposure.



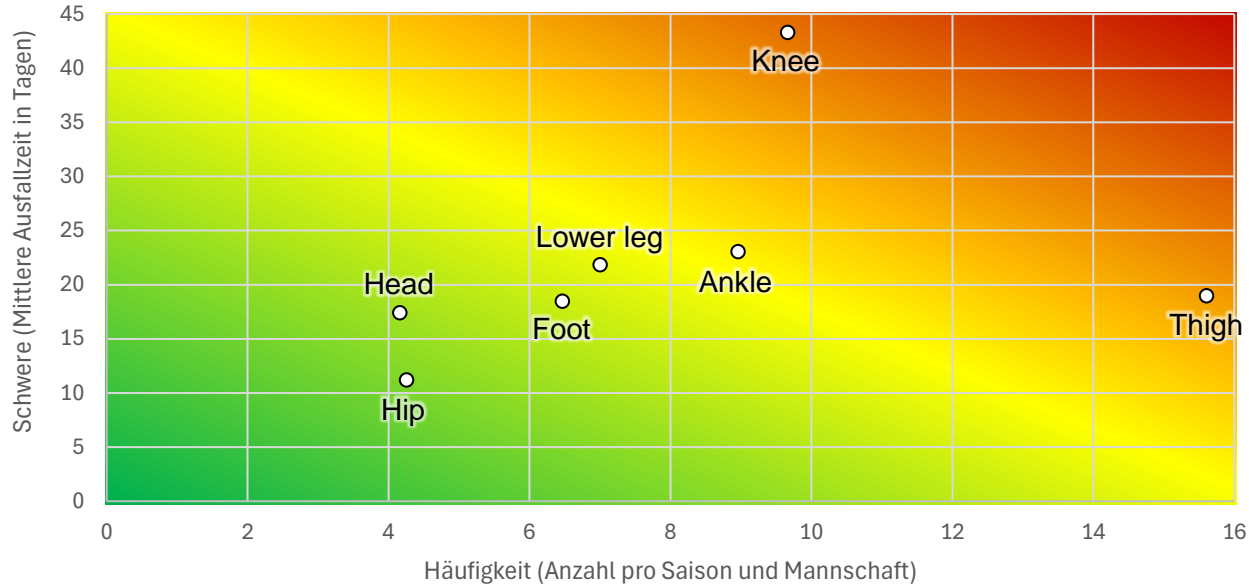
# Risiko Matrix – Körperregionen

Bundesliga und 2. Bundesliga 2014 - 2023, n = 21.469 Verletzungen



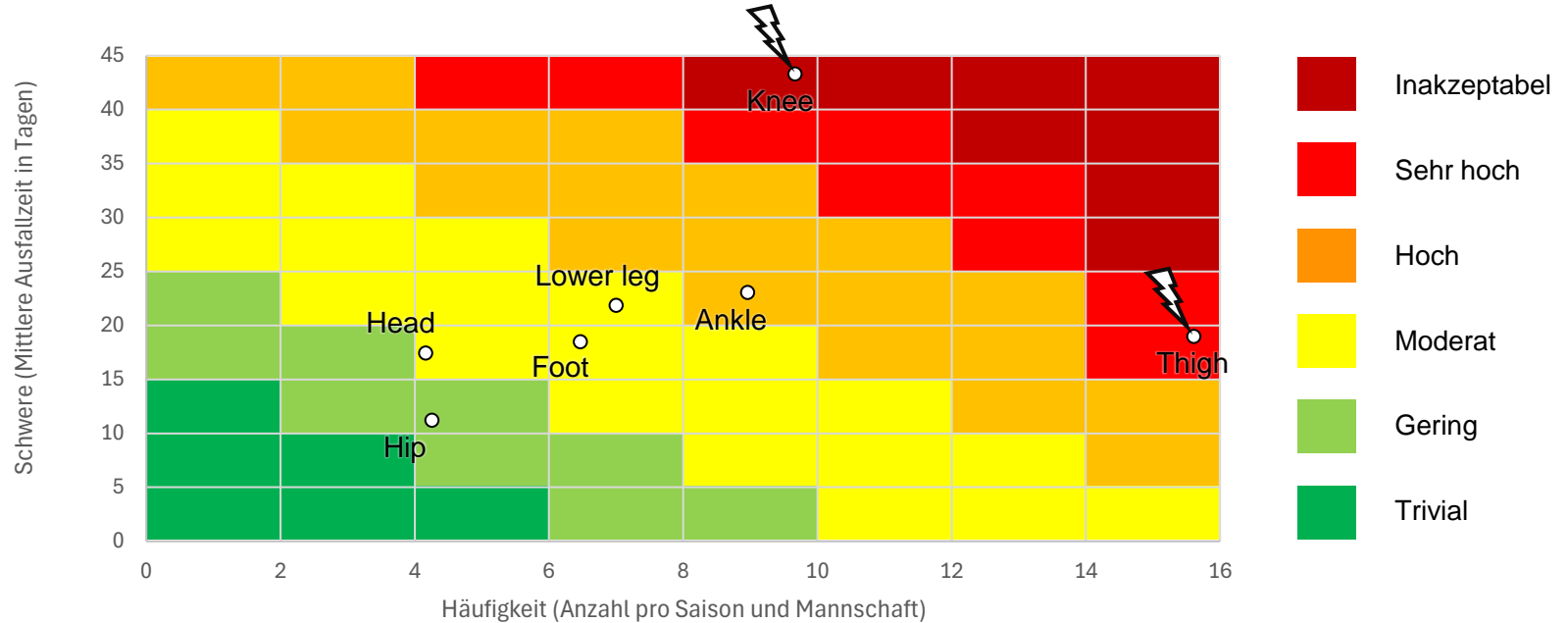
# Risiko Matrix – Körperregionen

Bundesliga und 2. Bundesliga 2014 - 2023, n = 21.469 Verletzungen



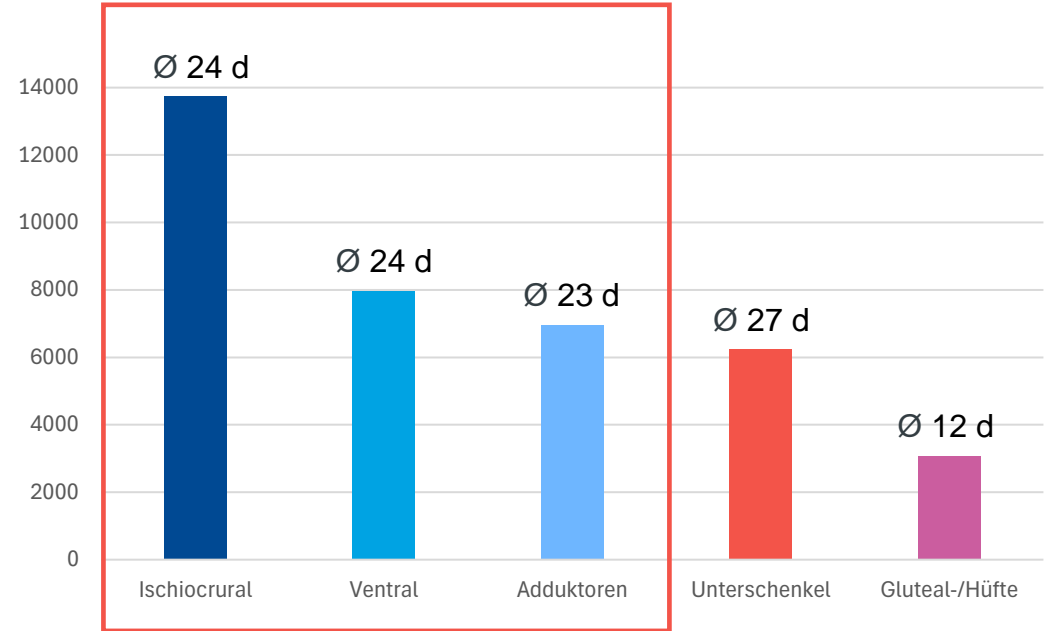
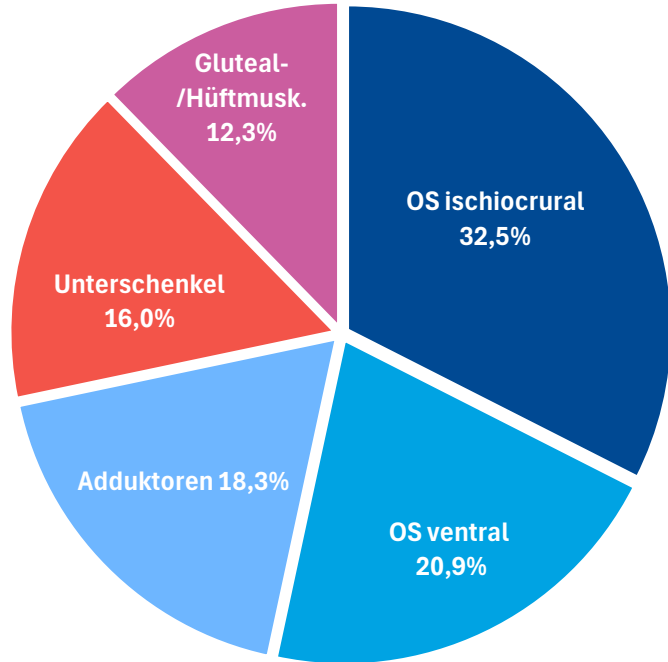
# Risiko Matrix – Körperregionen

Bundesliga und 2. Bundesliga 2014 - 2023, n = 21.469 Verletzungen



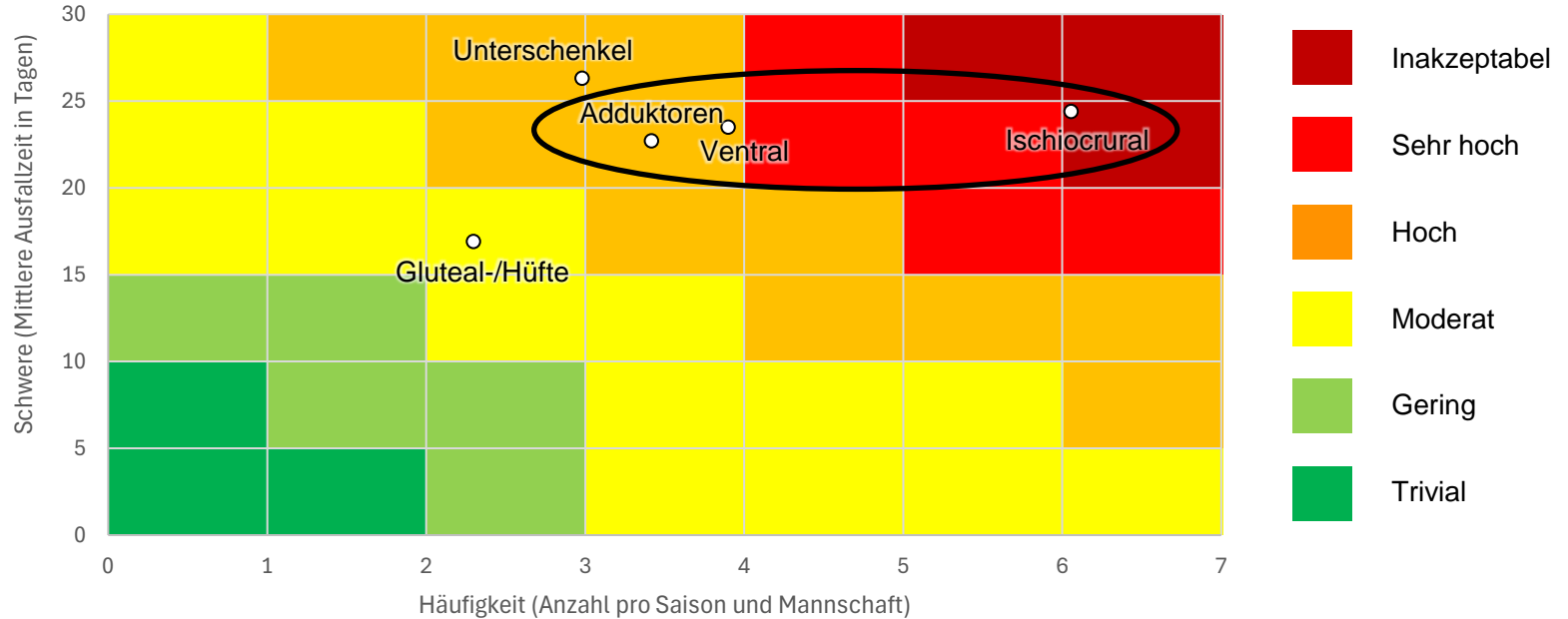
# Muskelverletzungen im Vergleich – Häufigkeit und Schwere

Bundesliga und 2. Bundesliga 2020 - 2023, n = 2.014 Verletzungen



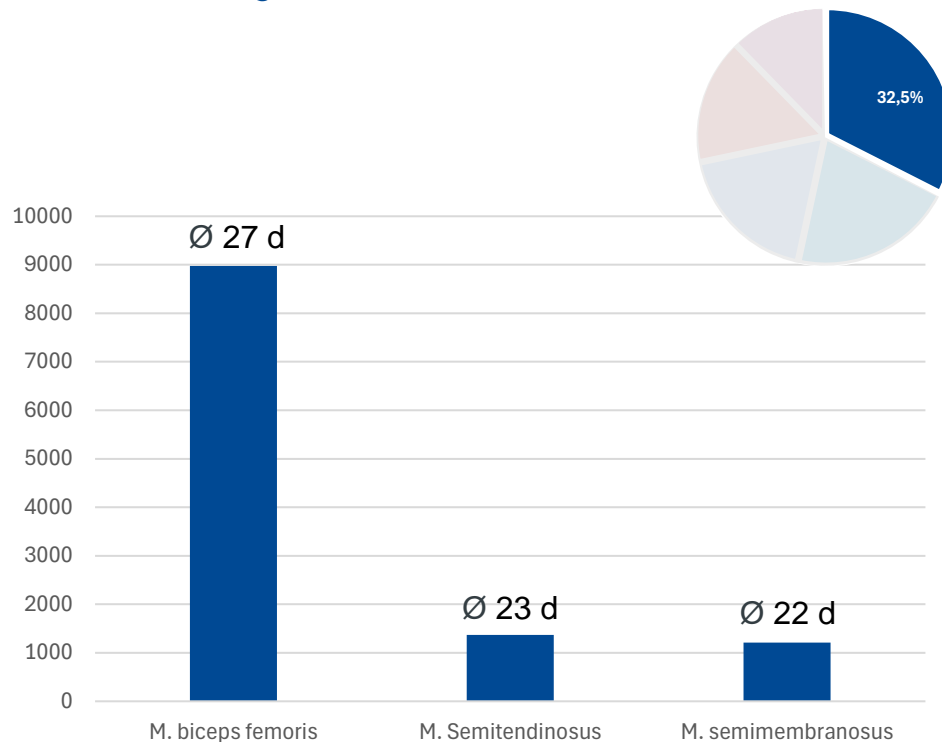
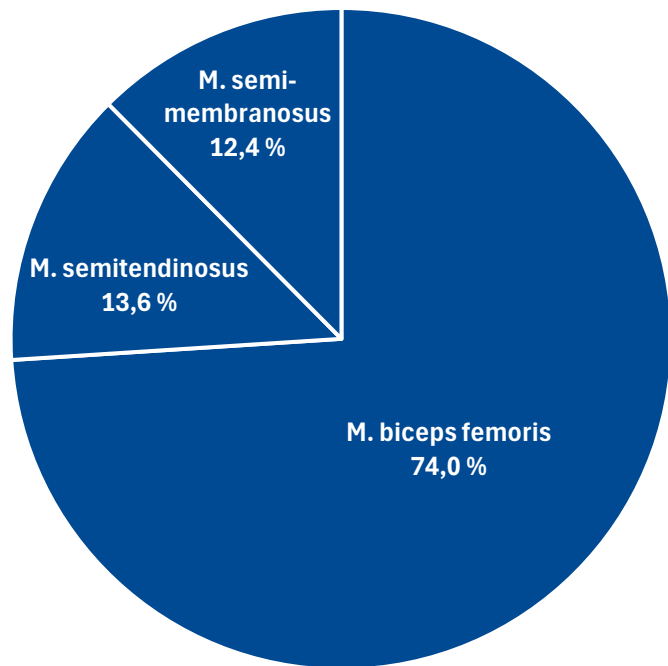
# Risiko Matrix – Muskelverletzungen

Bundesliga und 2. Bundesliga 2020 - 2023, n = 2.014 Verletzungen



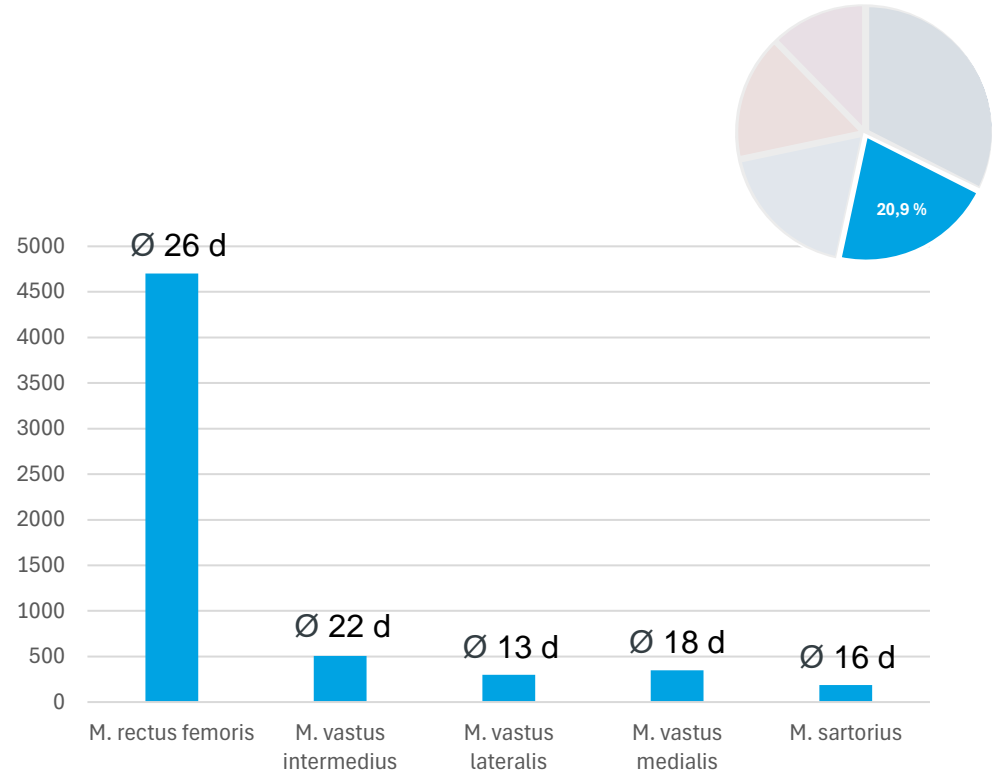
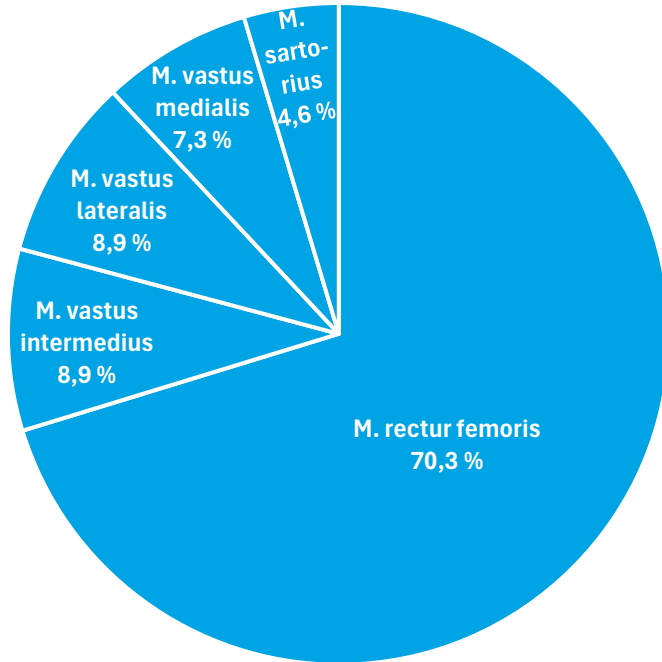
# Ischiocrurale Muskelverletzungen – Häufigkeit und Schwere

Bundesliga und 2. Bundesliga 2020 - 2023, n = 654 Verletzungen



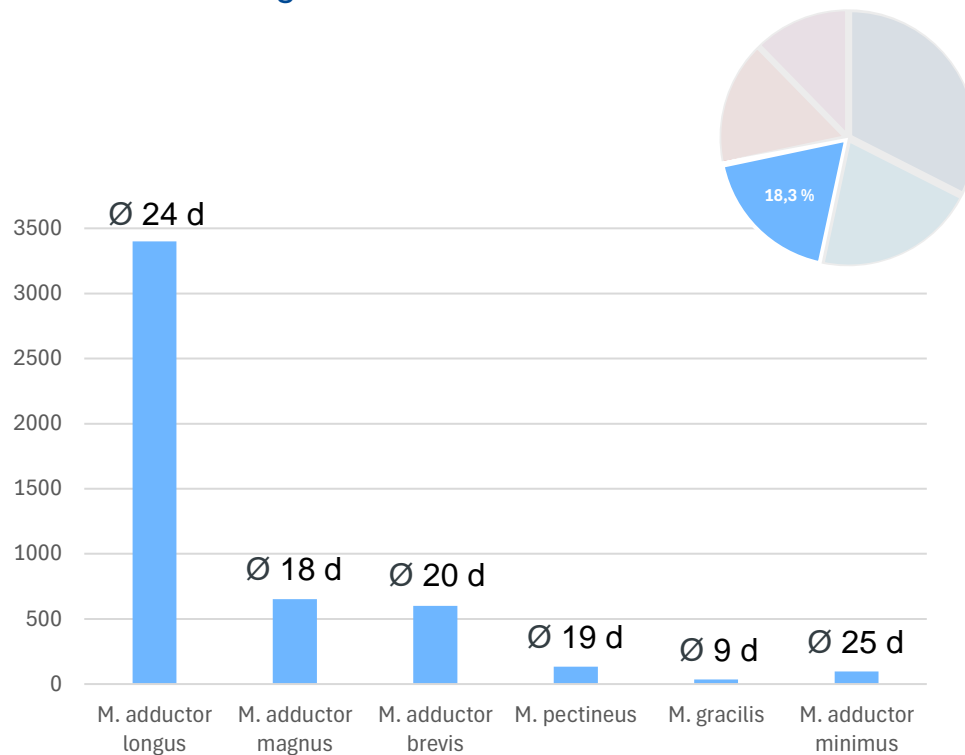
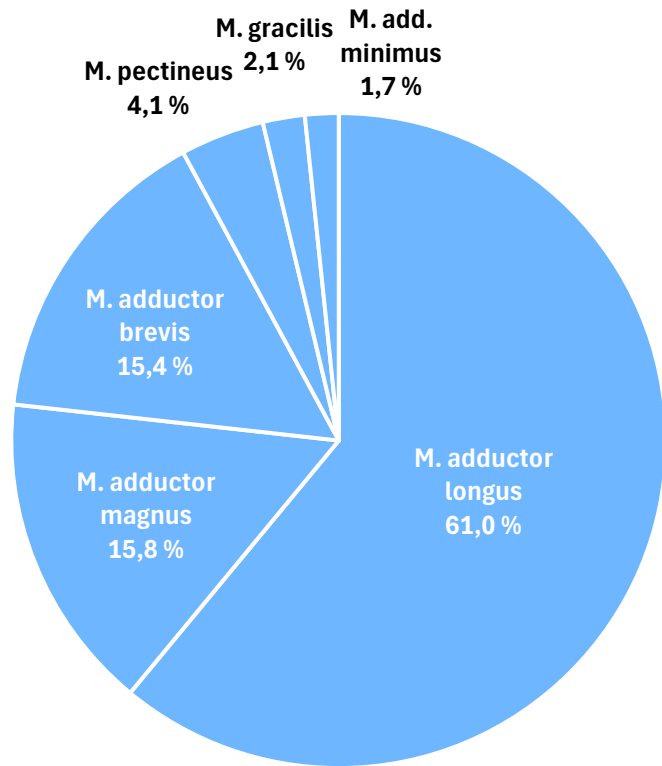
# Ventrale Muskelverletzungen – Häufigkeit und Schwere

Bundesliga und 2. Bundesliga 2020 - 2023, n = 421 Verletzungen



# Adduktorenverletzungen – Häufigkeit und Schwere

Bundesliga und 2. Bundesliga 2020 - 2023, n = 369 Verletzungen



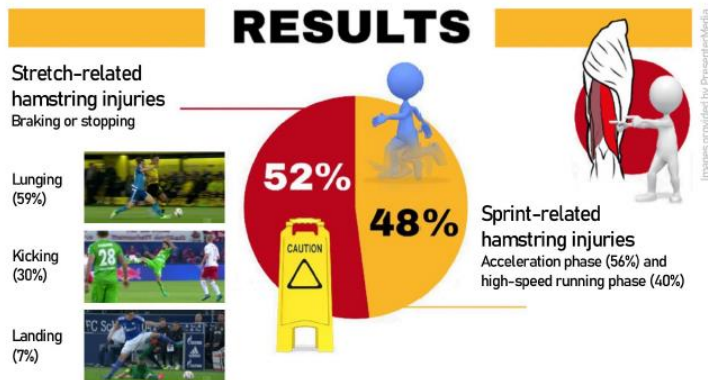


# ***Wie entstehen Muskelverletzungen?***

# Ätiologie: Hamstringverletzungen



52 cases of acute non-contact and indirect contact match hamstring injuries of the two highest divisions in German male football were analyzed (ie, time loss of >7 days).



The kinematic analysis of stretch-related injuries revealed a change of movement involving knee flexion to knee extension and a knee angle of  $<45^\circ$  when the injury occurred in all closed and open chain movements.

Biceps femoris was the most affected muscle (79%) of all included cases.



Original research

## Hamstring injury patterns in professional male football (soccer): a systematic video analysis of 52 cases

Thomas Gronwald <sup>1</sup>, Christian Klein <sup>2</sup>, Tim Hoenig <sup>3</sup>, Micha Pietzonka <sup>2</sup>, Hendrik Bloch <sup>2</sup>, Pascal Edouard <sup>4,5</sup>, Karsten Hollander <sup>1</sup>

### What are the findings?

- ▶ The three typical reported injury patterns for hamstring injuries were (1) sprint-related injuries, (2) stretch-related closed-chain injuries while lunging and (3) stretch-related open-chain injuries while kicking.
- ▶ All sprint-related hamstring injuries occurred during linear acceleration and high-speed running phases.
- ▶ All stretch-related hamstring injuries were characterised by a change of movement from knee flexion to knee extension with a knee angle of  $<45^\circ$  at the assumed injury frame.

### How might it impact on clinical practice in the future?

- ▶ The results provide evidence on how hamstring injuries occur in professional male football and show typical situational patterns and biomechanical characteristics that need to be considered for injury risk reduction strategies.
- ▶ Strategies for treatment and reduction of hamstring injuries in professional male football should target the three main injury patterns, namely, sprinting, lunging (closed-chain) and kicking (open-chain), including a variety of exercises and in-field situations to prepare the hamstring muscles to the diversity of potential hamstring injury patterns.

# Ätiologie: Anterior thigh muscles

Table 1: Illustration of three typical injury patterns for moderate and severe anterior thigh muscle injuries in professional male football

Injury Pattern	Prior injury scene	Assumed injury scene	Post injury scene
1) Non-contact pattern: Player in bright color sustains injury while kicking			
2) Indirect-contact pattern: Player #26 sustains injury while sprinting duel with opponent			
3) Contact pattern: Player in stripes sustains injury while attacking from a knee-to-thigh collision with opponent			



# Ätiologie: Adductor longus injuries



**Figure 2** Examples of the four categories of player actions at the time of injury: (A) change of direction, (B) kicking, (C) reaching, (D) jumping. These four players injured their right adductor longus.

Original article

## Mechanisms of acute adductor longus injuries in male football players: a systematic visual video analysis

Andreas Serner,<sup>1,2</sup> Andrea Britt Mosler,<sup>1,3</sup> Johannes L Tol,<sup>1,4</sup> Roald Bahr,<sup>1,5</sup> Adam Weir<sup>1,6</sup>

### What are the findings?

- ▶ Acute adductor longus injury situations vary greatly. Player actions can be categorised into change of direction, kicking, reaching and jumping.
- ▶ Kicking and jumping injury actions follow an open chain movement, typically involving a rapid change of movement from hip extension to hip flexion, and hip abduction to adduction, with the hip externally rotated.
- ▶ Change of direction and reaching injury actions follow a closed chain movement, typically involving a combination of hip extension and hip abduction of the injured leg with the hip externally rotated.

# *Möglichkeiten der Prävention*



# Exercise-based Programmes

## Review

Do exercise-based prevention programmes reduce non-contact musculoskeletal injuries in football (soccer)? A systematic review and meta-analysis with 13 355 athletes and more than 1 million exposure hours

Italo Ribeiro Lemes <sup>1</sup>, Rafael Zambelli Pinto <sup>1,2</sup>, Vitor N Lage, <sup>2</sup>  
 Bárbara A B Roch, <sup>2</sup> Evert Verhagen <sup>3</sup>, Caroline Bolling, <sup>3</sup> Cecilia Ferreira Aquino, <sup>4,5</sup>  
 Sérgio T Fonseca <sup>1,2</sup>, Thales R Souza <sup>1,2</sup>

## What are the new findings?

- ▶ Exercise-based prevention programmes reduce, on average, the risk of non-contact musculoskeletal injuries by 23%.
- ▶ Focused exercise-programmes reduce the risk of non-contact hamstring injuries by 35%.
- ▶ The injury incidence rate of overall non-contact injuries (for control group only) was 0.96 per 1000 hours of exposure.

## Review

Table 1 Characteristics of the included studies

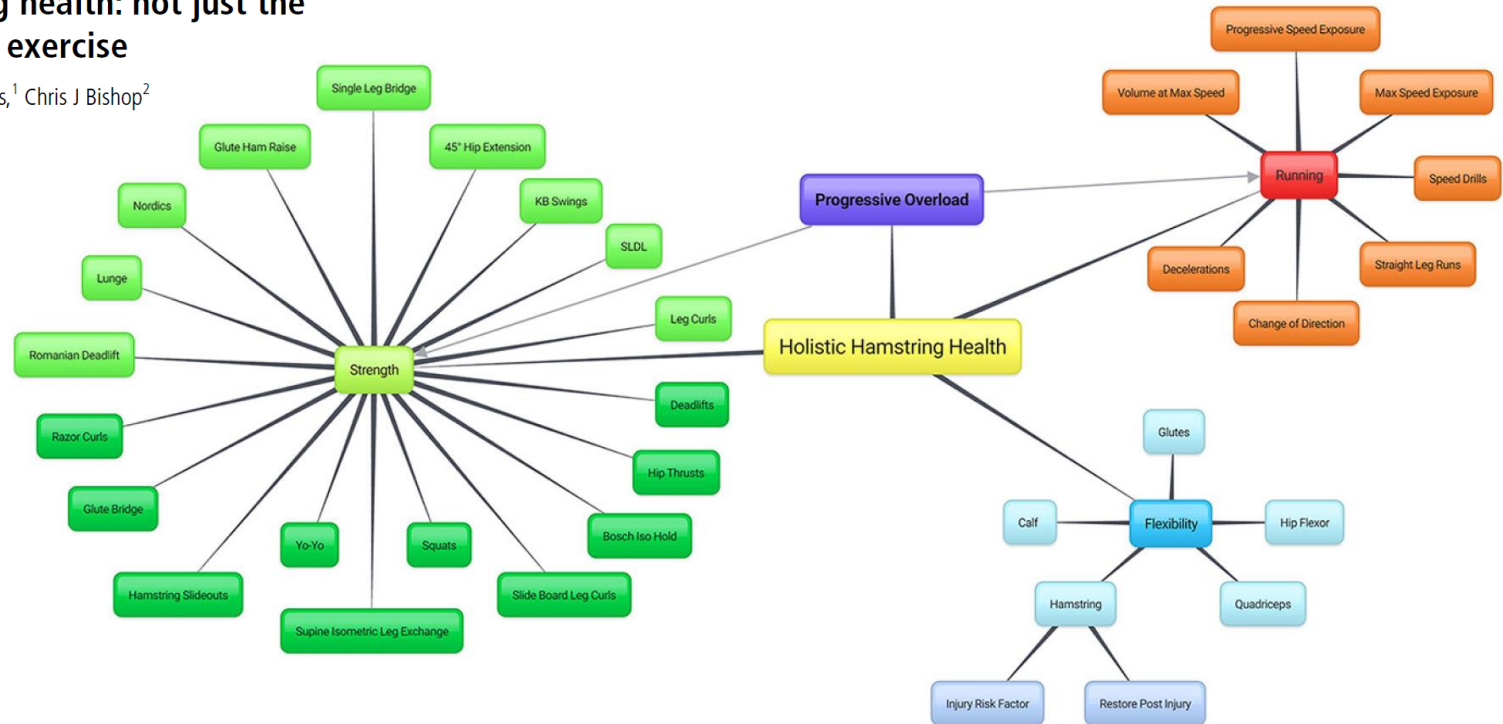
Study, year	Country	Participants (all football players)	Sample size	Intervention	Study length	Outcome
Gilchrist, 2008 <sup>31</sup>	USA	Female collegiate Age IG: 19.9 CG: 19.9	IG: 583 CG: 852	General Prevent Injury and Enhance Performance (PEP) Programme 3 times/week	12 weeks	Non-contact ACL injuries
Hammes et al, 2015 <sup>43</sup>	Germany	Male veteran (≥32 years) Age IG: 45.2±7.7 CG: 43.1±6.5	IG: 146 CG: 119	General FIFA 11+ Every training session	9 months	Overall injuries
Hasebe et al, 2020 <sup>44</sup>	Japan	Male high school Age IG: 16.7±0.5 CG: 16.3±0.6	IG: 156 CG: 103	Focused Nordic Hamstring Exercise After training session 2 times/week	27 weeks	Overall hamstring injuries
Owoeye et al, 2014 <sup>45</sup>	Nigeria	Male youth Age IG: 17.8±0.9 CG: 17.5±1.1	IG: 212 CG: 204	General FIFA 11+ 2 times/week	6 months	Overall injuries
Silvers-Granelli et al, 2017 <sup>46</sup>	USA	Male collegiate Age IG: 20.0±2.0 CG: 21.0±1.0	IG: 675 CG: 850	General FIFA 11+ 2-3 times/week	5 months	Overall ACL injuries
Soligard et al, 2008 <sup>47</sup>	Norway	Female youth Age IG: 15.4±0.7 CG: 15.4±0.7	IG: 1055 CG: 837	General FIFA 11+ 2 times/week	8 months	Overall lower limb injuries
Steffen et al, 2008 <sup>41</sup>	Norway	Female youth Age IG: 15.4±0.8 CG: 15.4±0.8	IG: 1073 CG: 947	General FIFA 11 Every training session for 15 consecutive sessions, then 1 time/week for the rest of the season	8 months (including pre-season and summer break)	Overall injuries
van de Hoef et al, 2018 <sup>42</sup>	The Netherlands	Male amateur Age IG: 23.8±6.4 CG: 22.2±3.1	IG: 229 CG: 171	Focused Bounding Exercise Programme (BEP) Every training session	39 weeks	Overall hamstring injuries
van der Horst et al, 2015 <sup>40</sup>	The Netherlands	Male amateur Age IG: 24.5±3.6 CG: 24.6±4.1	IG: 292 CG: 287	Focused Nordic Hamstring Exercise After training session 2 times/week	13 weeks	Overall hamstring injuries
Waldén et al, 2012 <sup>46</sup>	Sweden	Female adolescents Age IG: 14.0±1.2 CG: 14.1±1.2	IG: 2479 CG: 2085	General Neuromuscular training (Knäkontroll) 2 times/week	7 months	Overall knee injuries

CG, control group; IG, intervention group.

# Holistische Trainingsprogramme

## Holistic hamstring health: not just the Nordic hamstring exercise

Aiden J Oakley,<sup>1</sup> Jacob Jennings,<sup>1</sup> Chris J Bishop<sup>2</sup>



# You can run, but you cannot hide...



14:30–15:00

Speed steigern – Verletzungen minimieren –  
Reha beschleunigen!

**Raphael Schuler**, Speed Coach & Consultant,  
Gründer KEYtoSPEED.com

## Review If You Want to Prevent Hamstring Injuries in Soccer, Run Fast: A Narrative Review about Practical Considerations of Sprint Training

Pedro Gómez-Piqueras <sup>1,\*</sup> and Pedro E. Alcaraz <sup>2</sup>

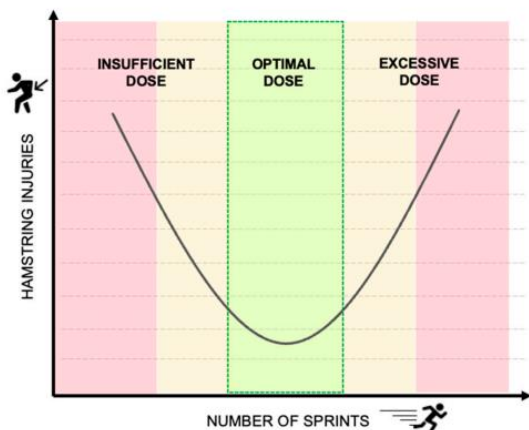


Figure 1. Relationship between the number of hamstring injuries and

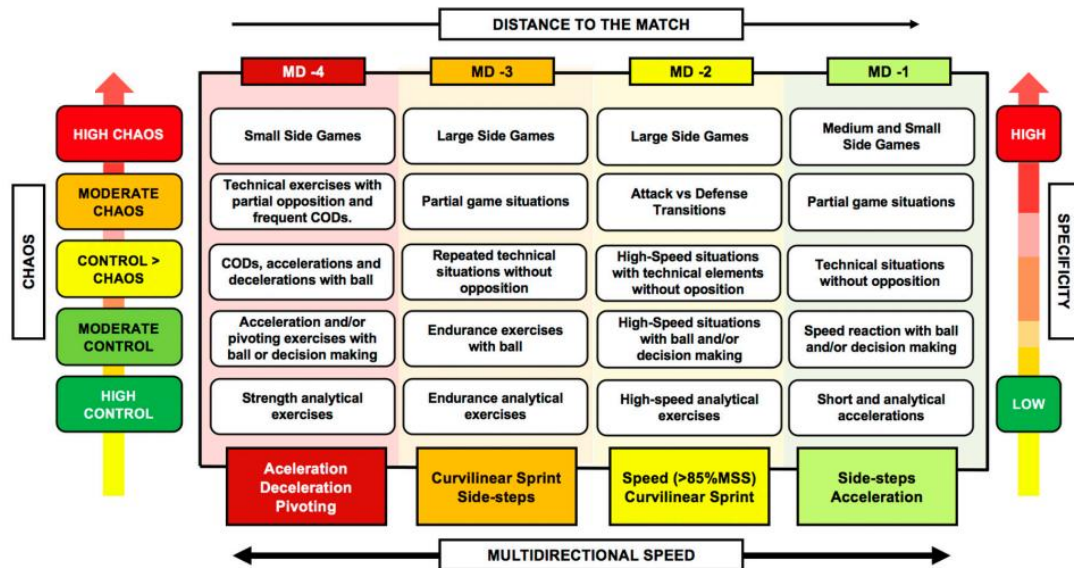
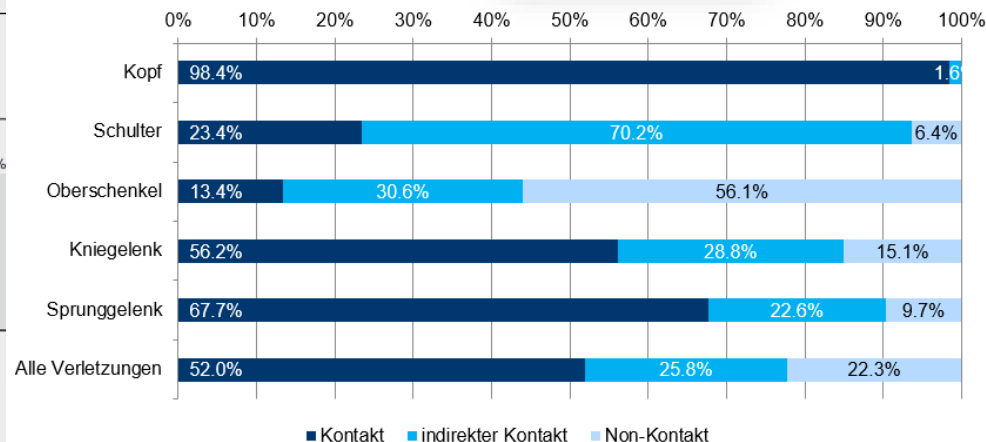
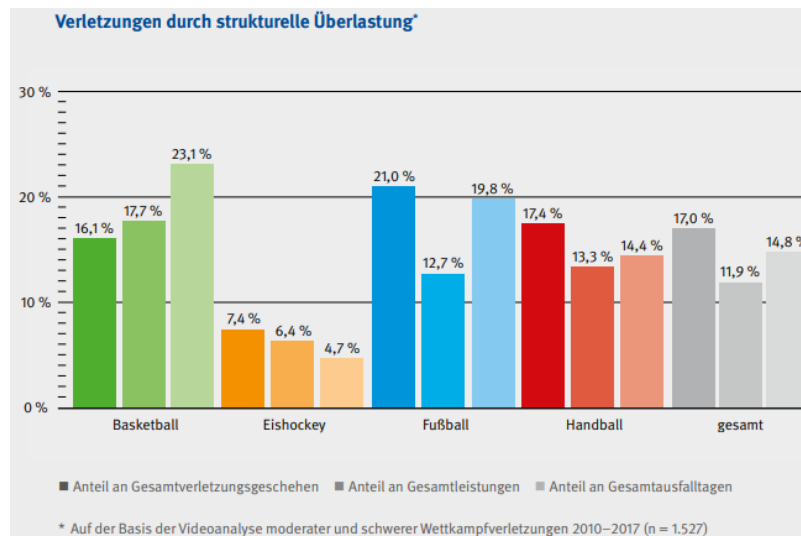


Figure 2. Proposal for the inclusion of the multidirectional speed model during the microcycle based on the complexity of the tasks (MD: matchday; CODs: changes of direction; MSS: maximal sprinting speed).



# Belastungssteuerung

<b>13:00-13:30</b>	Schlaf als Erfolgsfaktor im Fußball: Prävention und Leistungssteigerung	<b>Theresa Schnorbach</b> , Psychologin & Schlafwissenschaftlerin, Senior Team Lead bei Emma – The Sleep Company
<b>14:00-14:30</b>	Periodisierung im Athletiktraining	<b>Björn Muser</b> , Athletiktrainer, 1. FSV Mainz 05 U-23



# Return-to-Play

Knee Surgery, Sports Traumatology, Arthroscopy  
<https://doi.org/10.1007/s00167-019-05623-y>

SPORTS MEDICINE



**Injury burden differs considerably between single teams from German professional male football (soccer): surveillance of three consecutive seasons**

Christian Klein<sup>1,2</sup> · Patrick Luig<sup>3</sup> · Thomas Henke<sup>1</sup> · Petra Platen<sup>1</sup>

Received: 7 January 2019 / Accepted: 10 July 2019  
© European Society of Sports Traumatology, Knee Surgery, Arthroscopy (ESSKA) 2019

## Recurrent injuries

The overall rate of recurrent injuries was 7.1% ( $n=532$ ). Most recurrent injuries (47.7%;  $n=254$ ) occurred between 2 and 12 months after a player's return to full participation (late recurrence), as shown in Table 3. Almost half of all recurrent injuries (48.1%;  $n=256$ ) were thigh injuries, particularly muscle injuries of the hamstrings and the adductors, followed by injuries of the ankle (24.6%;  $n=131$ ) and the knee (14.8%;  $n=79$ ). The resulting burden of these 466 recurrent injuries that affected the thigh, knee and ankle represented 6.2% of the total injuries, and led to 7355 absence days (9.5% of the total burden). BL1 and BL2 did not differ notably considering the distribution of recurrent injuries.

**IJSPT**

ORIGINAL RESEARCH

**INJURY RISK IS ALTERED BY PREVIOUS INJURY: A SYSTEMATIC REVIEW OF THE LITERATURE AND PRESENTATION OF CAUSATIVE NEUROMUSCULAR FACTORS**

Jessica Fulton, PT, DPT, HFS<sup>1</sup>  
Kathryn Wright, PT, DPT<sup>1</sup>  
Margaret Kelly, PT, DPT, CSCS<sup>1</sup>  
Britanee Zebrosky, PT, DPT, CSCS<sup>1</sup>  
Matthew Zanis, PT, DPT, ATC, CSCS<sup>1</sup>  
Corey Drvol, PT, DPT<sup>1</sup>  
Robert Butler, PT, PhD<sup>1</sup>

ORIGINAL ARTICLE

**Previous injury as a risk factor for injury in elite football: a prospective study over two consecutive seasons**

M Häggglund, M Waldén, J Ekstrand



Br J Sports Med 2006;40:767-772. doi: 10.1136/bjsm.2006.026609

### What this study adds

- Players who are injured during one season have an increased risk of injury in the following season
- Having a previous hamstring injury, groin injury, and knee joint trauma increased the risk of an identical injury in the same leg the following season, whereas no such relation was observed for ankle sprain. Age was not identified as a risk factor for injury

### What is already known on this topic

- Previous injury is the most important risk factor for football injury
- Multivariate analyses are recommended for risk factor studies of sports injuries but few studies have applied analytical methods that account for exposure time

# Return-to-Play

PRE

- **Pre-Injury-Screening** = Referenzdatenerhebung für die Rehabilitation z.B. im Rahmen der Leistungsdiagnostik

RTA

- **Return-to-Activity** = Übergang von der klinischen Versorgung in das allgemeine Rehabilitationstraining

RTS


- **Return-to-Sport** = Übergang vom allgemeinen in das sportspezifische Rehabilitationstraining

RTP

- **Return-to-Play** = Übergang ins uneingeschränkte Mannschaftstraining – Ende der Arbeitsunfähigkeit

RTC

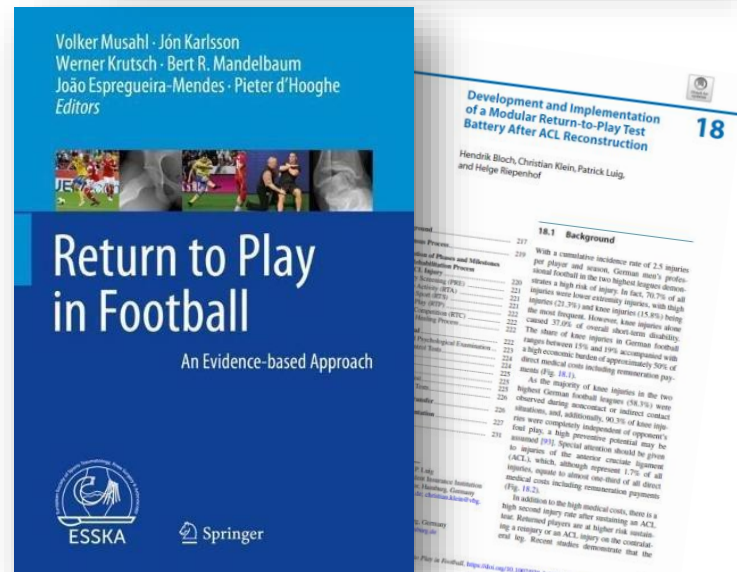
- **Return-to-Competition** = Gesamtprozess bis zum ersten Wettkampfeinsatz

Trauma Berufskrankung  
DOI 10.1007/s10039-017-0236-z  
© Springer Medizin Verlag Berlin 2017  
 CrossMark

H. Bloch<sup>1</sup> · C. Klein<sup>2</sup> · P. Luig<sup>3</sup> · H. Riepenhoff<sup>4</sup>  
<sup>1</sup>Verwaltungs-Berufsgenossenschaft (VBG), Präventionsfeld Sport, Bezirksverwaltung Bielefeld, Bielefeld, Deutschland  
<sup>2</sup>Verwaltungs-Berufsgenossenschaft, Präventionsfeld Sport, Bezirksverwaltung Bergisch-Gladbach, Bergisch Gladbach, Deutschland  
<sup>3</sup>Verwaltungs-Berufsgenossenschaft, Präventionsfeld Sport, Bezirksverwaltung Duisburg, Duisburg, Deutschland  
<sup>4</sup>BG Klinikum Hamburg, Hamburg, Deutschland

## Return-to-Competition

Sicher zurück in den Sport



# Return-to-Play

Review

## Is subsequent lower limb injury associated with previous injury? A systematic review and meta-analysis

Liam A Toohey,<sup>1,2,3</sup> Michael K Drew,<sup>2,3</sup> Jill L Cook,<sup>1,3</sup> Caroline F Finch,<sup>1,3</sup> Jamie E Gaida<sup>4,5</sup>

Original article



Editor's choice  
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## Sports-related concussion increases the risk of subsequent injury by about 50% in elite male football players

Anna Nordström,<sup>1</sup> Peter Nordström,<sup>2</sup> Jan Ekstrand<sup>3</sup>

### Workshop I

11:00–12:00

Blood-Flow-Restriction-Training

oder

Handheld-Ultraschallgeräte – Bestandteil der Physiotherapie von morgen

oder

Innovative Technologie im Sport:  
EMG neu gedacht – schnell, einfach, effektiv

**Dr. Christian Raeder, Janina-Sophie Tennler,**  
Sportwissenschaftler, Athletikum Rhein Ruhr,  
BG Klinikum Duisburg

**Jan-Niklas Droste,** Director Health & Human  
Performance, Red Bull – BORA – hansgrohe

**Simon Roth,** Physiotherapeut, Privatpraxis  
Roth & Geschäftsführer MYOact GmbH

VBG  
die gesetzliche  
Unfallversicherung



VBG-Fachwissen

### Return-to-Competition

Testmanual zur Beurteilung der Spielfähigkeit  
nach akuter lateraler Bandverletzung  
am Sprunggelenk

VBG  
die gesetzliche  
Unfallversicherung



Algorithmus zur praxisgerechten  
Diagnostik und Therapie bei  
Schädel-Hirn-Traumen im Sport

VBG  
die gesetzliche  
Unfallversicherung



VBG-Fachwissen

### Return-to-Competition

Testmanual zur Beurteilung der Spielfähigkeit  
nach Ruptur des vorderen Kreuzbands

VBG  
die gesetzliche  
Unfallversicherung



VBG-Fachwissen

### Return-to-Competition

Testmanual zur Beurteilung der Spielfähigkeit  
nach akuter Verletzung der Schulter

Orthopädie  
<https://doi.org/10.1007/s00132-024-04503-9>  
Angenommen: 5. April 2024

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Springer Medizin Verlag GmbH, ein Teil von  
Springer Nature 2024



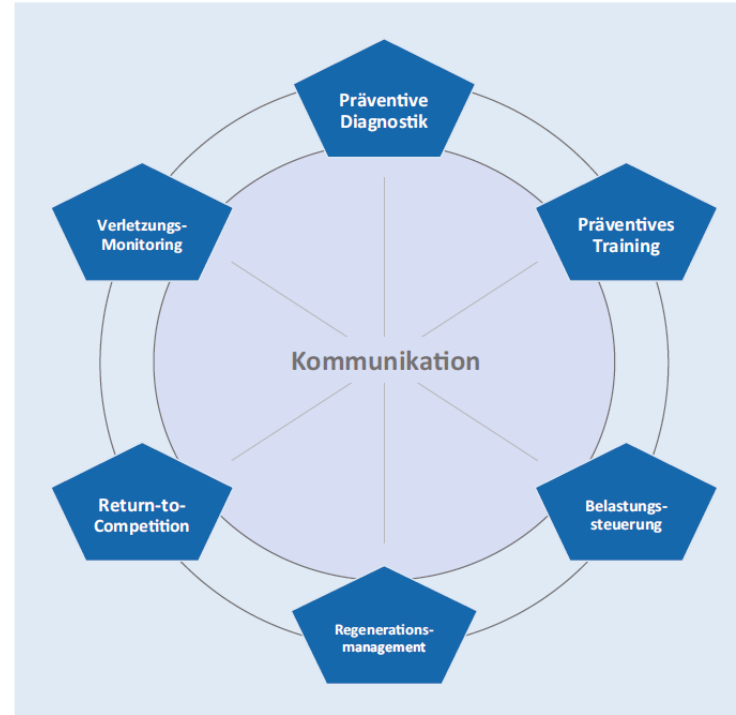
## Verletzungsprävention im Fußball

Herausforderung für Teamärzte und Trainerteam

Hendrik Bloch<sup>1</sup> · Christian Klein<sup>2</sup>

<sup>1</sup> Bezirksverwaltung Bielefeld, Verwaltungs-Berufsgenossenschaft (VBG), Bielefeld, Deutschland

<sup>2</sup> Bezirksverwaltung Bergisch Gladbach, Verwaltungs-Berufsgenossenschaft (VBG), Bergisch Gladbach, Deutschland



**Abb. 1** ◀ Die „Big-6 der Verletzungsprävention“ (adaptiert nach [21])

# Kommunikation

13:30–14:00

Ein Team, eine Sprache – Kommunikationsstrategien zwischen medizinischem Team und Trainerteam im Fußball

Chiara Behrens de Luna, M.Sc. Sportpsychologin, Hamburger SV & DFB U-17-Juniorinnen

Communication quality between the medical team and the head coach/manager is associated with injury burden and player availability in elite football clubs

Jan Ekstrand,<sup>1,2</sup> Daniel Lundqvist,<sup>3</sup> Michael Davison,<sup>2,4</sup> Michel D'Hooghe,<sup>2,5</sup> Anne Marte Pensgaard<sup>6</sup>

## What are the new findings?




- ▶ Elite football clubs with good quality internal communication had fewer injuries and greater player availability compared with clubs with poor communication.
- ▶ The communication between the head coach/manager and the medical team was associated with team injury rates.
- ▶ The quality of communication within the medical team, between doctors and physiotherapists, was generally very good in these elite football teams; however, in rare cases of poor communication, player availability at training was affected negatively.
- ▶ Teams with low communication quality between the medical team and the fitness coaches had low player attendance at training.

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## Higher level of communication between the medical staff and the performance staff is associated with a lower hamstring injury burden: a substudy on 14 teams from the UEFA Elite Club Injury Study

Jan Ekstrand ,<sup>1</sup> Martin Häggglund ,<sup>2</sup> Markus Waldén ,<sup>3</sup> Håkan Gauffin,<sup>4</sup> Christophe Baudot,<sup>5</sup> Paco Biosca,<sup>6</sup> Markus Braun,<sup>7</sup> Karl Heinrich Dittmar,<sup>8</sup> Dimitrios Kalogiannidis,<sup>9</sup> Steve McNally,<sup>10</sup> Ricard Pruna,<sup>11</sup> Nelson Puga,<sup>12</sup> Max Sala,<sup>13</sup> Luca Stefanini,<sup>14</sup> Peter Ueblicher,<sup>15</sup> Bruno Vanhecke,<sup>16,17</sup> Maikel van Wijk,<sup>18</sup> Wart Van Zoest,<sup>19,20</sup> José María Villalón Alonso,<sup>21</sup> Armin Spreco<sup>22,23</sup>

## CONCLUSIONS

A lower hamstring muscle injury burden was associated with a higher level of communication between the medical staff and the performance staff. Successful teams with low injury rates emphasised club-related factors, including good communication between the coach, medical and performance staff and ongoing medical involvement in load management. These factors warrant further investigation in prospective studies.





CEO

Medical  
Staff

Coaching  
Staff









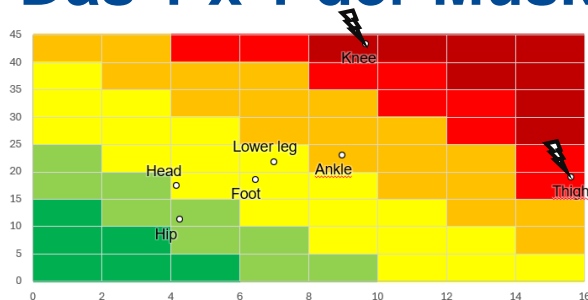
BIRTHDAY  
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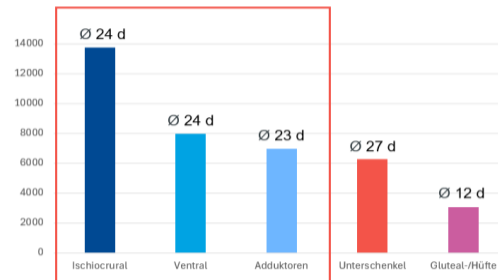
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@#12Lp?!!

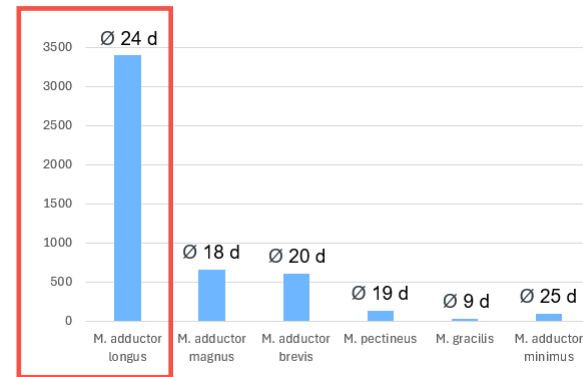
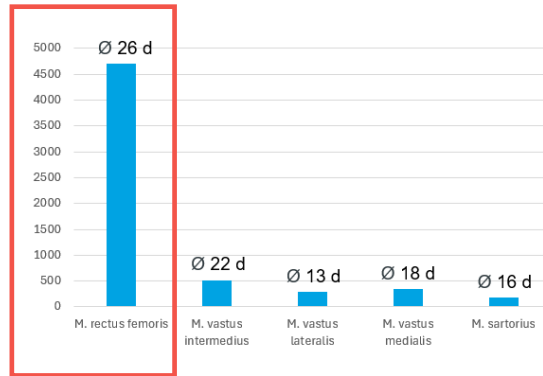
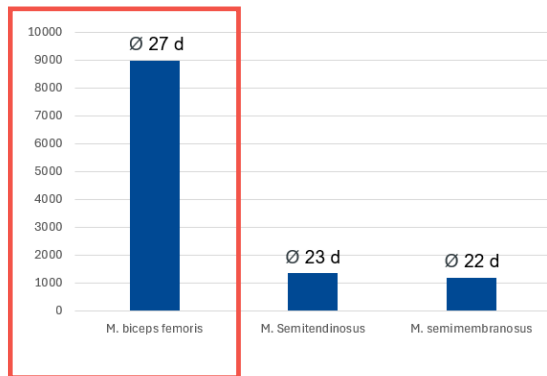
# Das 1 x 1 der Muskelverletzungen



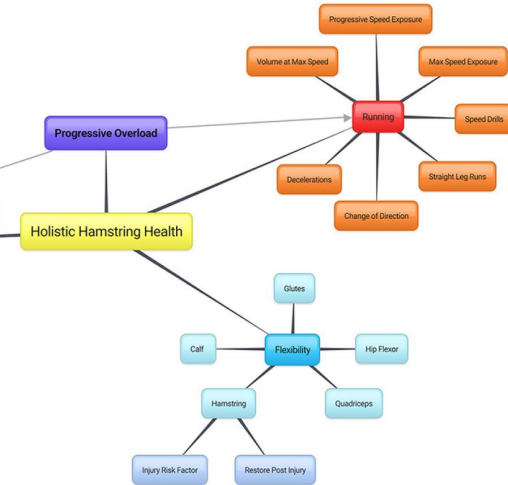
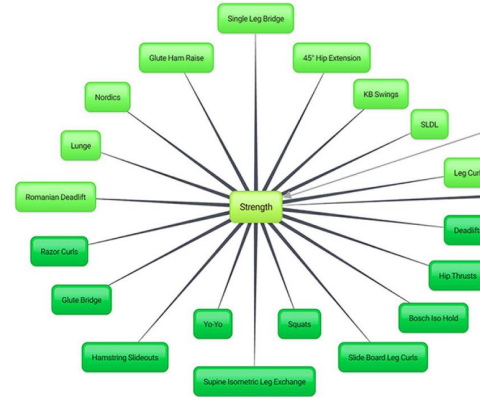
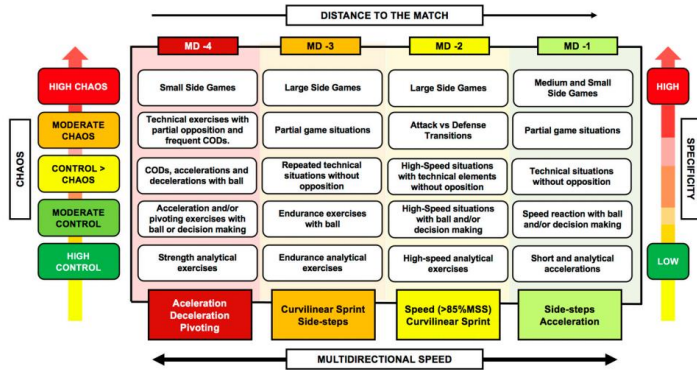
→ Jedes Profi-Team erleidet ca. 16 OS-Verletzungen pro Saison; daraus resultiert > 1 Woche AU / Spieler



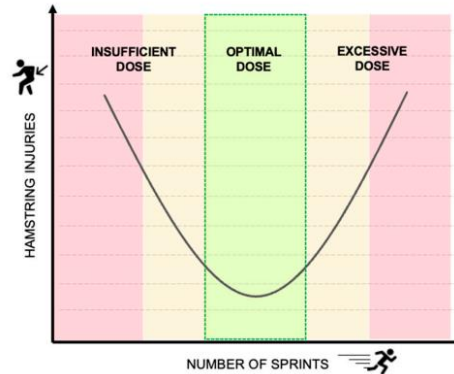
→ Aufgrund des Burdens gilt: Hams > Quad > Add!



# ...und was wir dagegen tun können



- PRE** • **Pre-Injury-Screening** = Referenzdatenerhebung für die Rehabilitation z.B. im Rahmen der Leistungsdiagnostik
- RTA** • **Return-to-Activity** = Übergang von der klinischen Versorgung in das allgemeine Rehabilitationstraining
- RTS** • **Return-to-Sport** = Übergang vom allgemeinen in das sportspezifische Rehabilitationstraining
- RTP** • **Return-to-Play** = Übergang ins uneingeschränkte Mannschaftstraining – Ende der Arbeitsunfähigkeit
- RTC** • **Return-to-Competition** = Gesamtprozess bis zum ersten Wettkampfeinsatz





**Dr. Christian Klein**  
Wissenschaftskoordinator Sport

**Vielen Dank für**

**Ihre Aufmerksamkeit.**



[christian.klein@vbg.de](mailto:christian.klein@vbg.de)



Dr Christian Klein



Christian Klein



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