



Hamstring testen

Hoe **ondersteunt** technologie onze besluitvorming?

Dr. Nick van der Horst
Sportfysiotherapeut PSV

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Acceleratie

Sprinten

Reiken

Schieten

Dribbelen

Deceleratie

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Vroeg starten Gezonde omgeving voor genezing

2

Organisatie littekenweefsel
Activatie satelliet cellen

- Ruptuur van myofibrillen
- Binnen uren haematoom & contractieband om beschadigde spiervezels

RESEARCH

The breaking and making of healthy adult human skeletal muscle in vivo
Ragotz, Moly, " and Michael Spier"

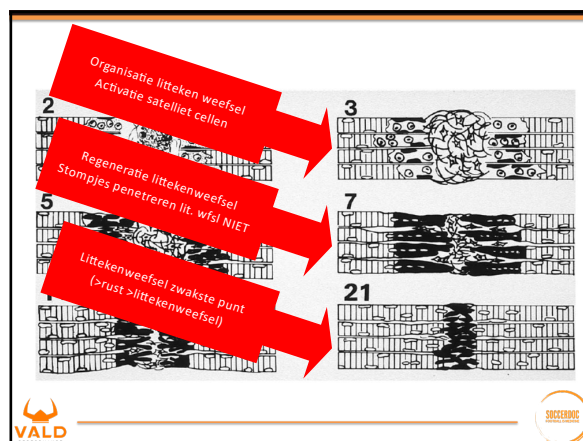
Mechanotherapy: how physical therapists' prescription of exercise promotes tissue repair
K M Khan, A Scott

Satelliet cellen activeren door belasting

VALD

SOCCEBDOC

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2

3

5

7

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Organisatie litteken weefsel
Activatie satelliet cellen

Regeneratie littekenweefsel
Stompjes penetreren lit. wissl NIET

Littekenweefsel zwakste punt
(>rust >littekenweefsel)

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! Start vroeg met belasten!

Elke dag dat je wacht met starten van belasten kost je 3 dagen in Return-to-Play tijd

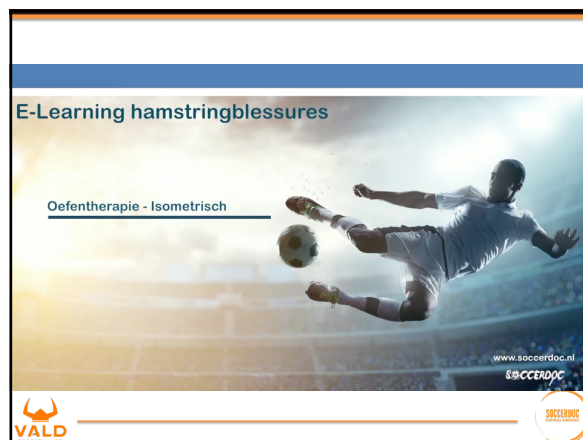
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E-Learning hamstringblessures

Oefentherapie - Isometrisch



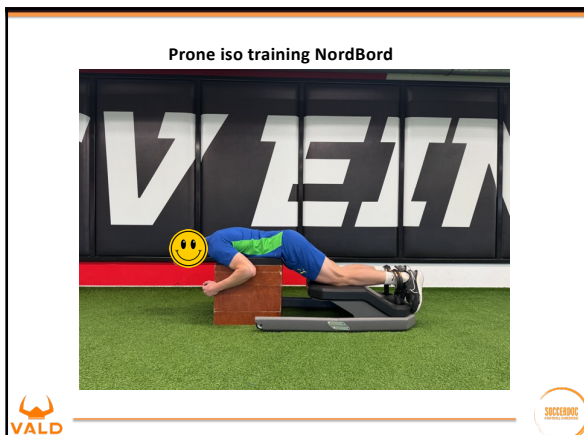
www.soccerdoc.nl

SOCCEBDOC

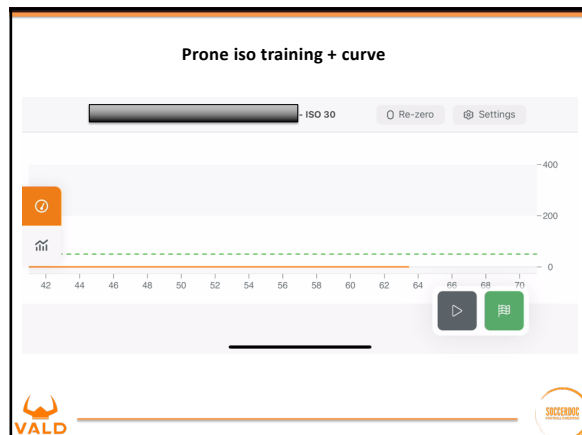
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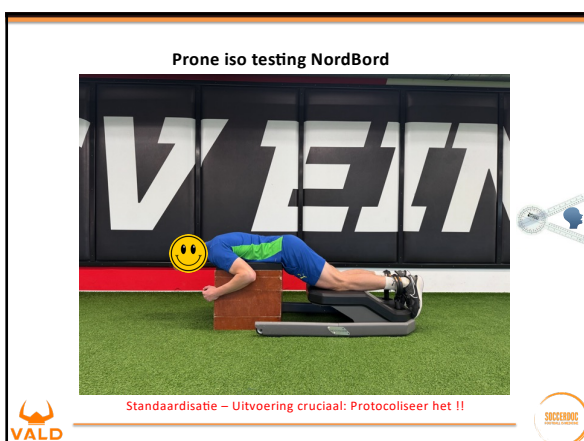
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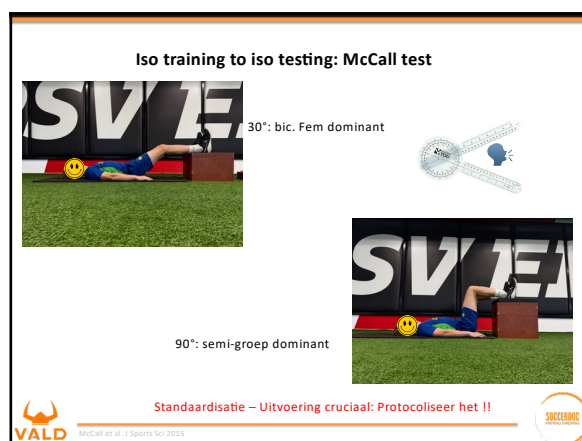
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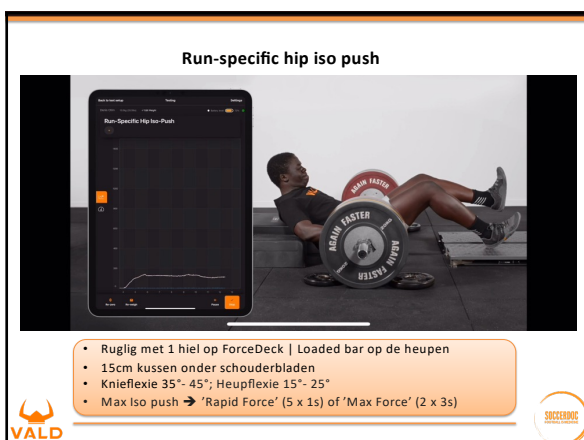
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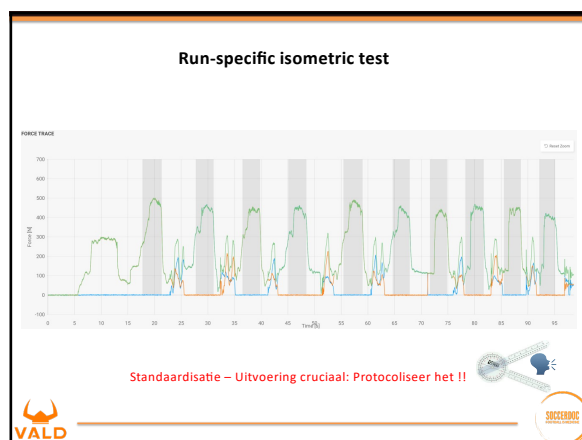
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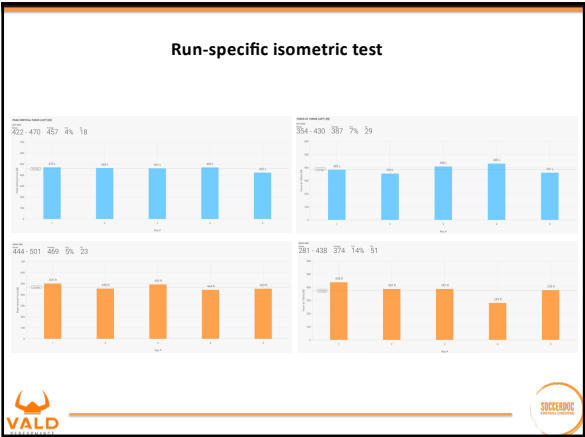
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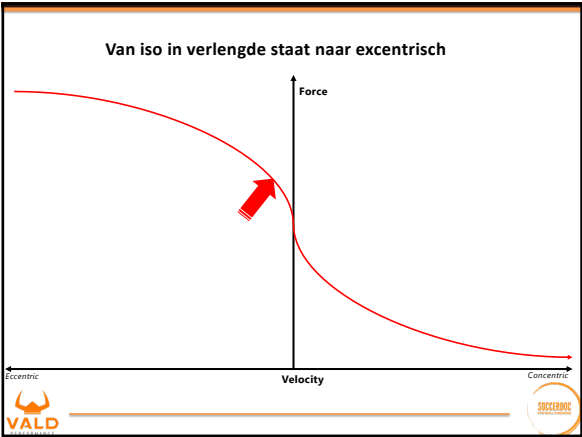
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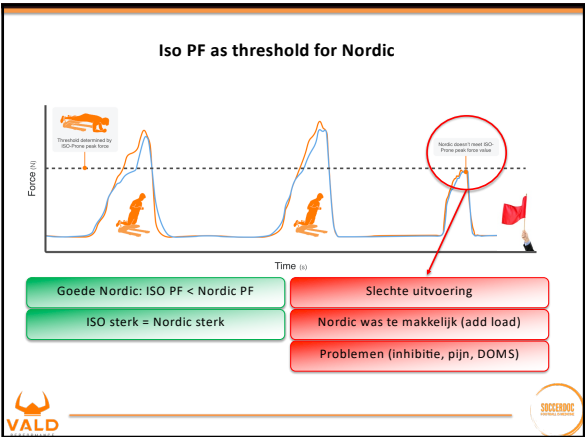
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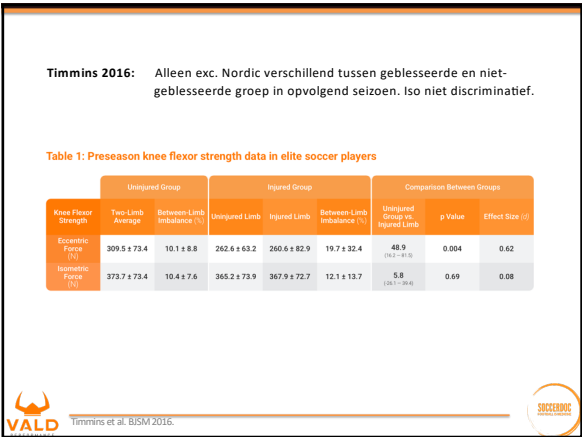
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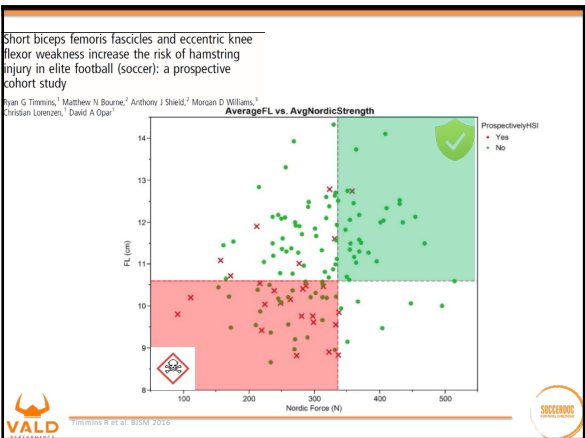
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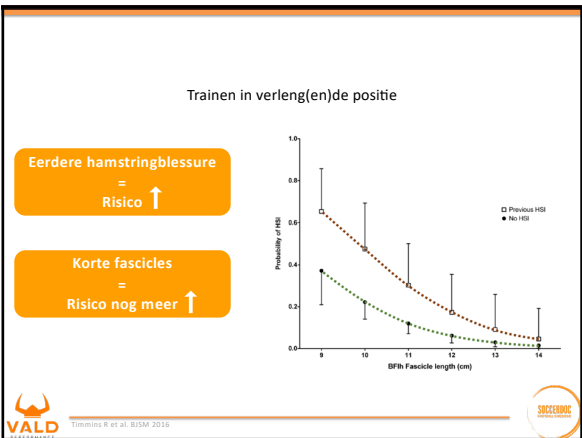
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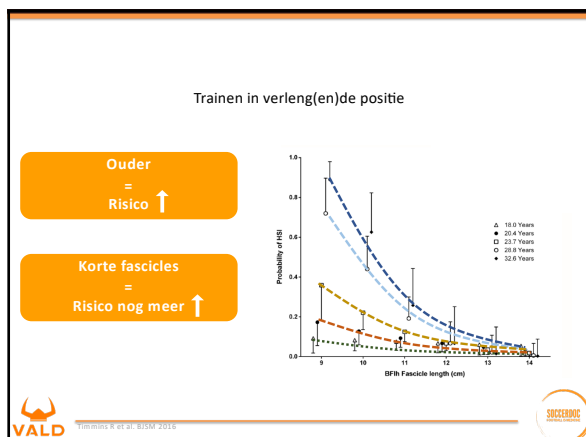
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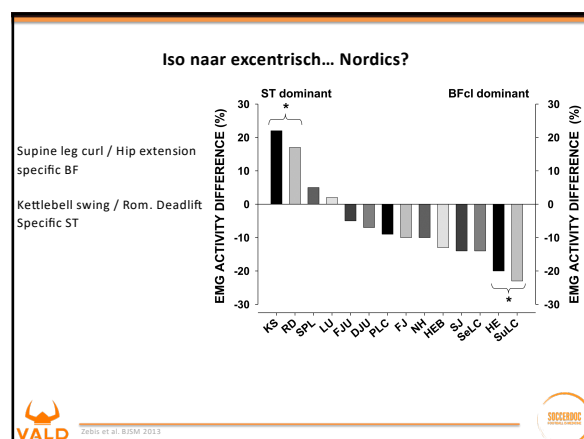
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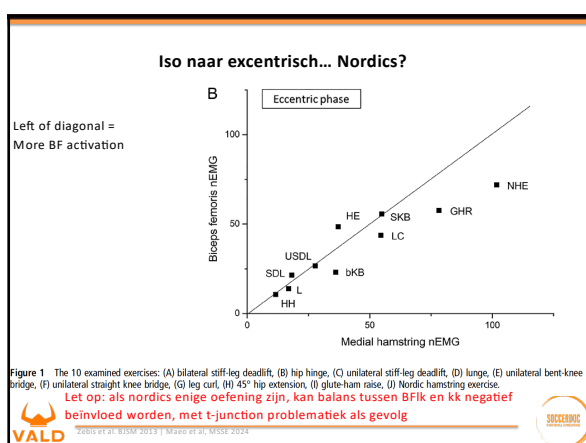
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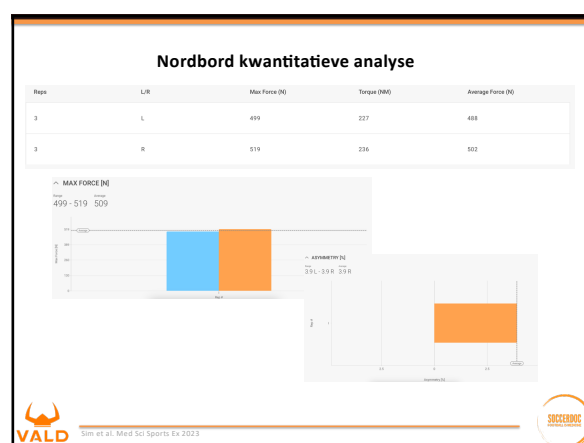
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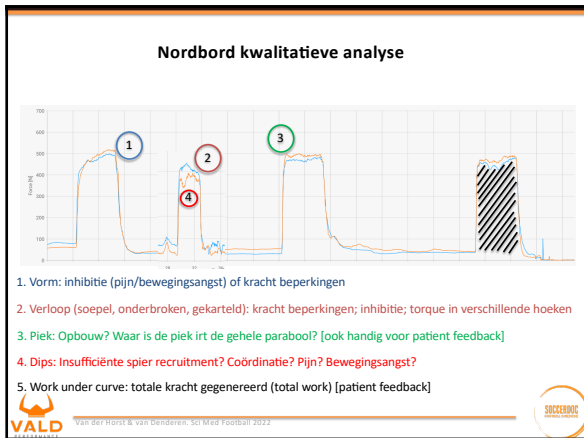
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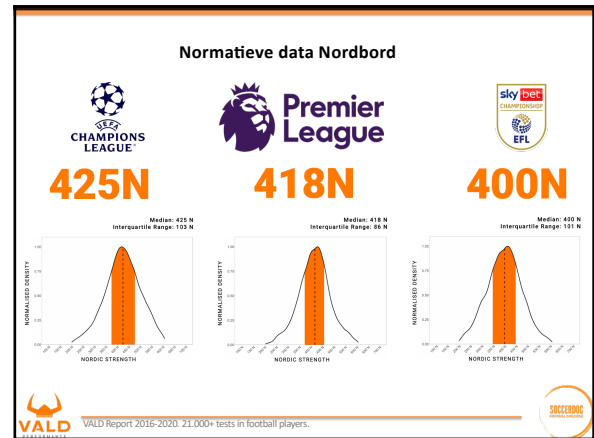
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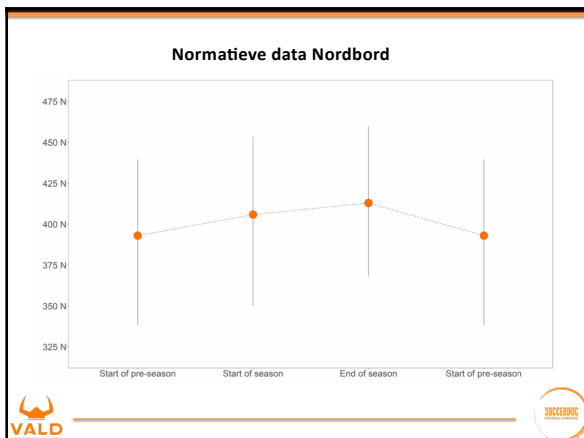
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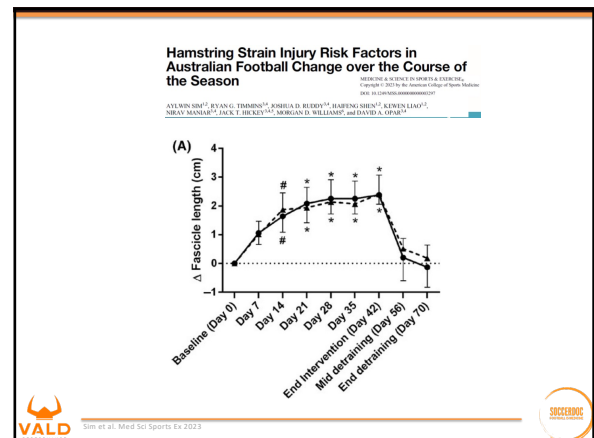
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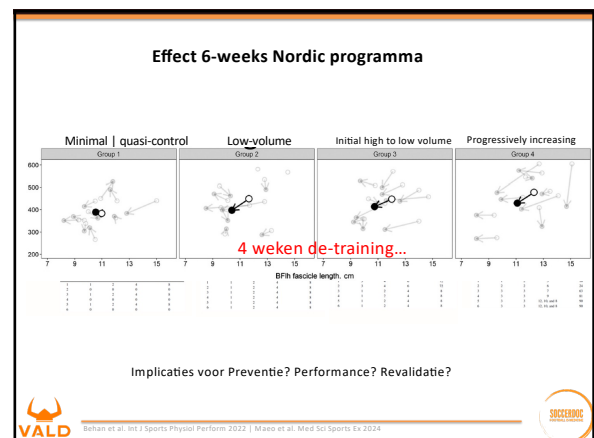
The Dose-Response of the Nordic Hamstring Exercise on Biceps Femoris Architecture and Eccentric Knee Flexor Strength: A Randomized Interventional Trial

Faraghat P, Behan, Robin Vermeulen, Rod Whitley, Ryan G. Timmins, Joshua D. Ruddy, and David A. Opar

Group	Week	Frequency	Sets	Repetitions	Total repetitions
Group 1: minimal volume/quasi-control	1	1	2	4	8
	2	0	0	0	0
	3	1	2	4	8
	4	0	0	0	0
	5	1	2	4	8
Group 2: low volume	6	0	0	0	0
	1	1	2	4	8
	2	1	2	4	8
	3	1	2	4	8
	4	1	2	4	8
Group 3: initial high volume followed by low volume	5	1	2	4	8
	6	1	2	4	8
	1	3	4	6	72
	2	3	4	6	72
	3	1	2	4	8
Group 4: progressively increasing volume	4	1	2	4	8
	5	1	2	4	8
	6	1	2	4	8
	1	1	2	5	10
	2	2	2	6	24
	3	3	3	7	63
	4	3	3	9	81
	5	3	3	12, 10, and 8	90
	6	3	3	12, 10, and 8	90

Behan et al. Int J Sports Physiol Perform 2022 | Miao et al. Med Sci Sports Ex 2024

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DUS

REGELMATIGE EXCENTRISCHE STIMULI BELANGRIJK VOOR:

- + **FASCICLE LENGTH**
- + **EXCENTRISCHE KRACHTONTWIKKELING**
- + **FORCE OUTPUT**
- + **NEURALE ACTIVATIE**




Behan et al. Int J Sports Physiol Perform 2022 | Maza et al. Med Sci Sports Ex 2024

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Kracht vs sprinten





COMPARISON OF HAMSTRING MUSCLE ACTIVATION DURING HIGH-SPEED RUNNING AND VARIOUS HAMSTRING STRENGTHENING EXERCISES

Wahedi van den Gijzen^{1,2}, Jeroen Beekman^{1,2}, Jeroen Beekman^{1,2}

Kracht is een belangrijke voorwaarde, maar ...

Oefeningen behalen maar 8% tot **max. 75%** van de EMG activiteit van sprinten




Mendioguchia et al. PLOS One 2020 | van den Tillaa et al. Int J Sports Phys Ther 2017

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Sprint versus isolated eccentric training:
Comparative effects on hamstring
architecture and performance in soccer
players

Jordan Mendioguchia¹, Filippe Conzelmann^{2,3}, Pascal Edouard^{4,5,6}, Marco Fernandez^{4,5},
Roberto Parreira⁴, Hernani Lopes⁷, Jean-Benoit Morin^{1,2}, Pedro Jaramaz-Pereira^{1,2}



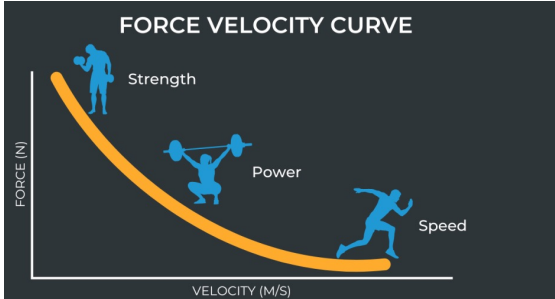
Conclusions

The results suggest that **sprint training was superior to NHE in order to increase BFth fasci-**
cle length although only the sprint training was able to both provide a preventive stimulus
(increase fascicle length) and at the same time improve both sprint performance and
mechanics. Further studies with advanced imaging techniques are needed to confirm the
validity of the findings.




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FORCE VELOCITY CURVE






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Kwalitatieve sprint analyse



Creëer mobiliteit keten (elite atleten: ±100° bij take-off)




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Rol van het bekken

Influence on R. Biceps Femoris Stretch (mm)

Muscle	Influence (mm)
l. iliopsoas	35
r. erector spinae	10
l. rectus femoris	40
r. vastus	5
r. gluteus maximus	10
l. lat oblique	10
l. int oblique	10
r. hamstrings	-10

Decreasing BF stretch Increasing BF stretch

VALD | Chumilavov, J. Biomech 2007 | SOCCERDOC

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Kwalitatieve sprint analyse

Extensie ±20/30° ; Flexie ±70/80°

VALD | SOCCERDOC

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Kwalitatieve sprint analyse

Extensie ±20/30° ; Flexie ±70/80°

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Sprint Mechanics Assessment Score – S-MAS

Question	Left	Right
Controlled Toe off Foot immediately goes to the contralateral foot landing the ground. Response: ☐		
Stride length Trailing foot is extended. Does the athlete land to be in a position of maximum force production for the leading leg oriented at 145°? From the vertical, without any side movement. Response: ☐		
Maximal Vertical Propulsion (MVP) Mid point between toe off and touch down. Does it align with the flight phase. Response: ☐		
Back Kick Is the heel of the leading foot above the heel of the trailing foot? Should not be higher than parallel with the knee. Response: ☐		
Trunk & Pelvis Rotation Do they both rotate excessively through the knee? The trunk should rotate more, trunk leading with the pelvis and the pelvis leading with the knee. Response: ☐		
Left Swing The point of maximal knee extension during the swing phase. Response: ☐		
Right Swing Is the knee of the trailing leg behind the pelvis at touch down? Response: ☐		
MVP to Left Swing Response: ☐		
Lumbar extension / Anterior Pelvic Tilt Do they both have a lumbar extension / Anterior Pelvic Tilt? Response: ☐		
Foot placement Part of foot contact with the ground. Response: ☐		
Forward lean Do they both lean forward? The trunk should lean forward more than the pelvis compared to the knee. Response: ☐		
Lumbar extension / Anterior Pelvic Tilt Do they both have a lumbar extension / Anterior Pelvic Tilt? Response: ☐		
Thigh Separation Is the angle between the thigh and the knee less than 90° at touch down? Response: ☐		
Side Angle Does the athlete land to be abducted? The hip should be in a neutral position at touch down. Response: ☐		
Foot inclination Is there a visible gap between the foot and the ground? The foot should be flat on the ground at touch down. Response: ☐		
Vertical Collapse / Mid-stance collapse Do they both have a vertical collapse? The trunk should be vertical at touch down. Response: ☐		
TOTAL SCORE		

VALD | Bramah et al. AJSM 2024 | SOCCERDOC

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Take-Homes

Kracht(opbouw) essentieel voor functie-herstel
Vroeg belasten, progressief belasten, excentrisch c.q. isometrisch op lengte belasten

Monitoring kracht(opbouw) ondersteunt revalidatie-progressie
"If you are not assessing, you are guessing"

Prone ISO
Eccentric Nordic
McCall
Run-specific iso

Zie de grotere context en bijbehorende deficiënties: Sprint !
Volume/kwaliteit van sprints monitoren/verbeteren cruciaal ter preventie recidief en verbetering prestatie

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Dank u !

in

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