



ÜBERSICHT

MULTIMODALE RÜCKENSCHMERZTHERAPIE

Kuni B, Schiltenswolf M

Multimodale Rückenschmerztherapie – der trainingswissenschaftliche Aspekt

Training Modules in Multidisciplinary Pain Therapy for Chronic Back Pain

Orthopädische Universitätsklinik Heidelberg

Literatur im Fokus

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Zusammenhang zwischen Schmerz, Bewegung und medizinischer Trainingstherapie

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Strukturierte Rehabilitation nach lumbaler Wirbelsäulenoperation

Orthopädie
1999 · 28: 932–938 © Springer-Verlag 1999

Zum Thema: Lumbalsyndrom – konservative Therapie

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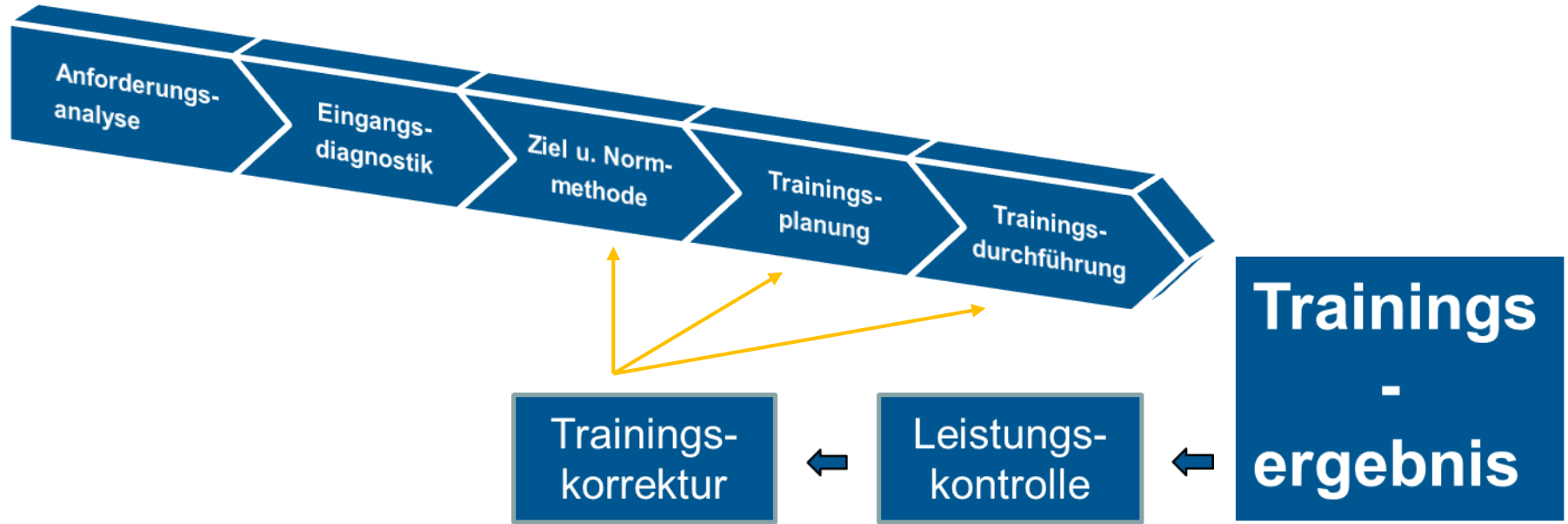
² Orthopädische Universitätsklinik, St. Josef-Hospital Bochum

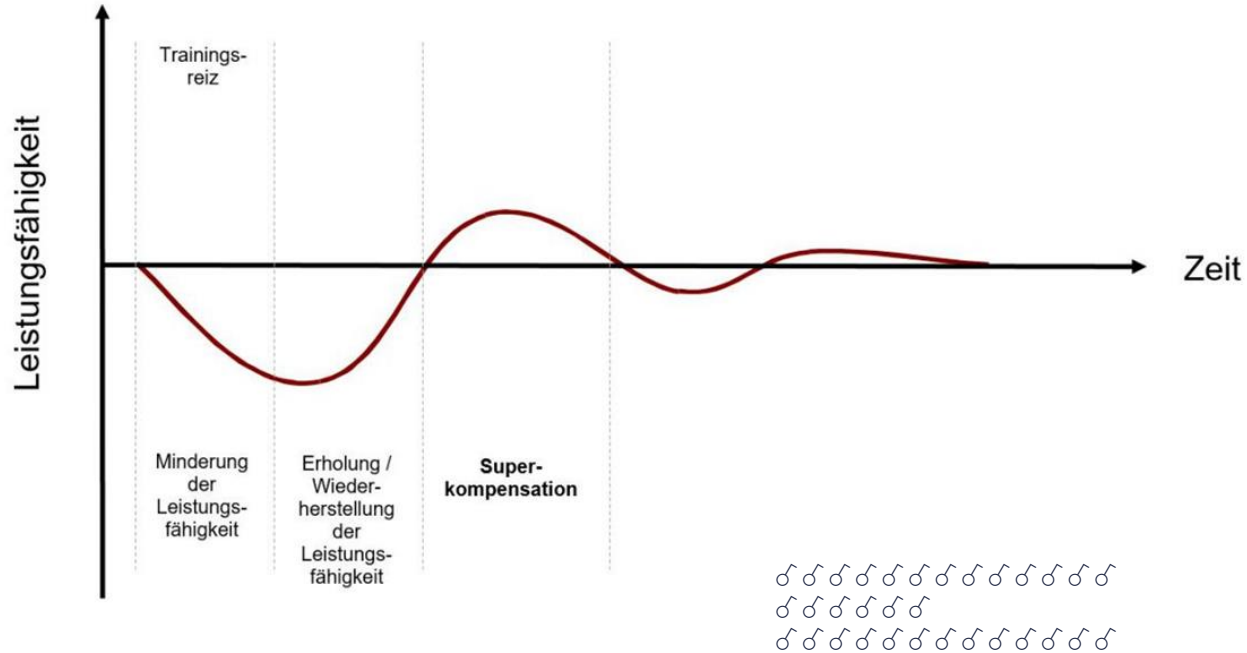
Medizinische Trainingstherapie bei Lumbalsyndromen

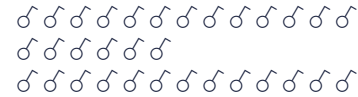
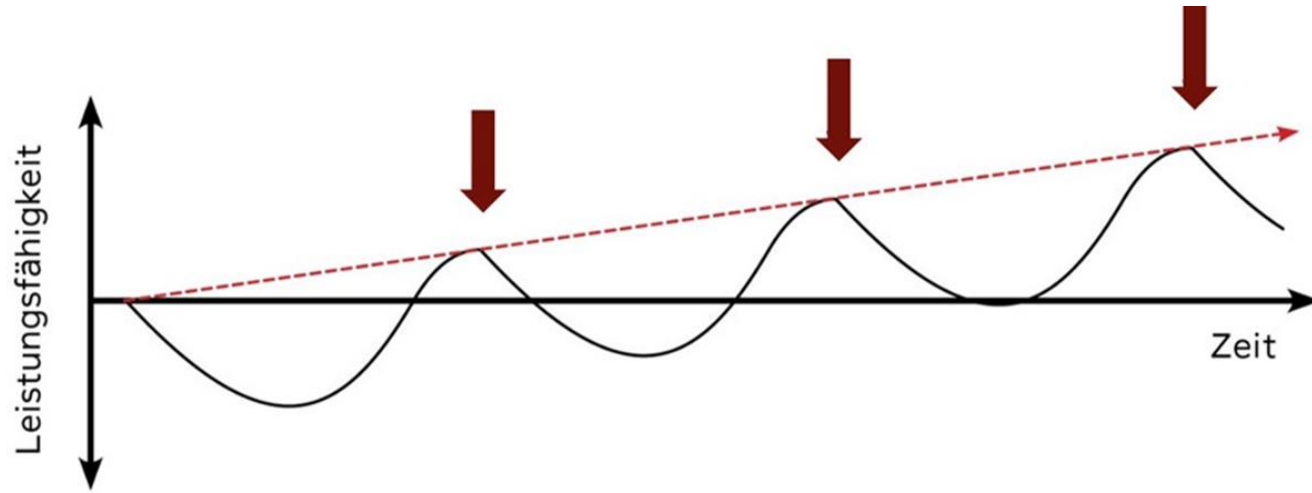
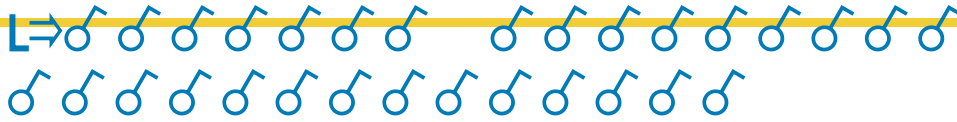


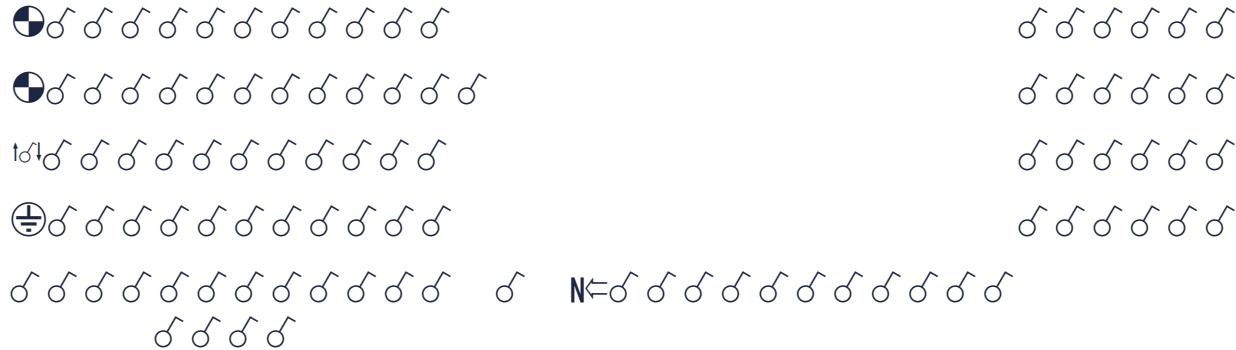
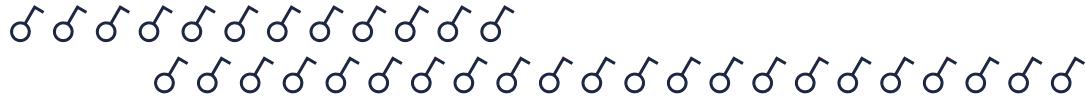
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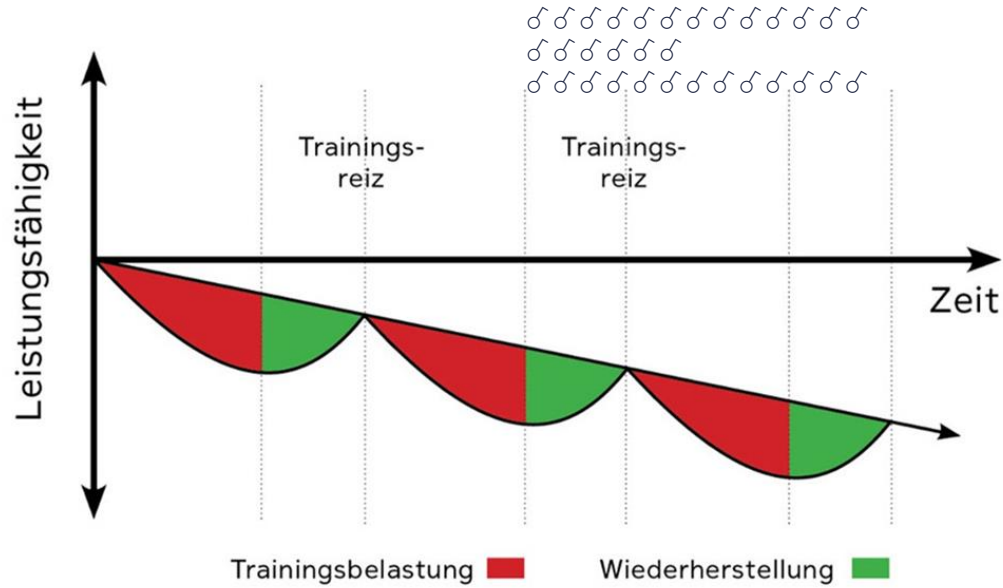
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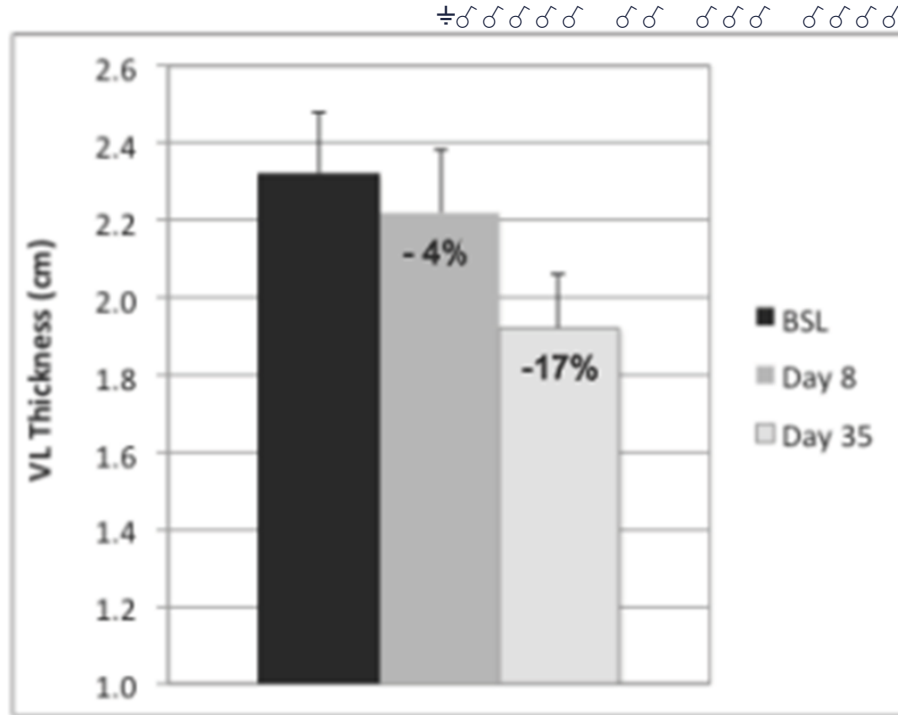
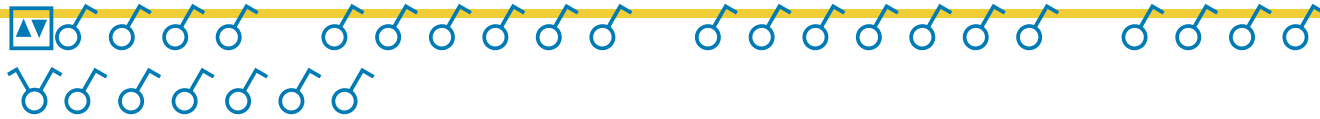






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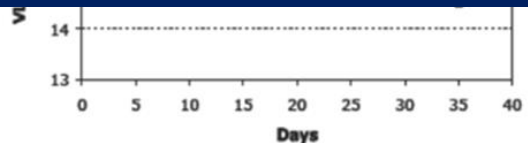
VL fascicle length and pennation angle at 0,10 and 35 day of BR (Valdoltra)

Verlust von Sarkomeren:

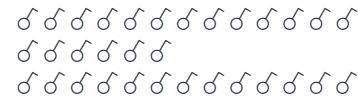
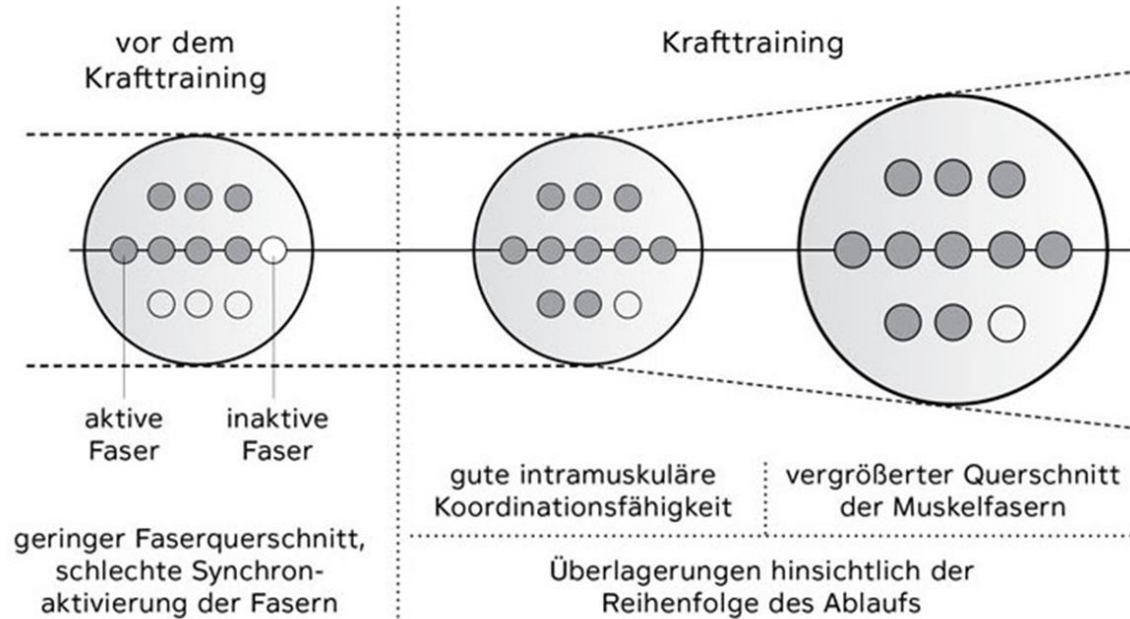
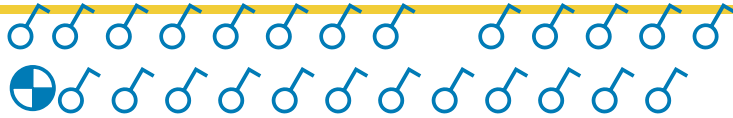
nach 10d: 3.360

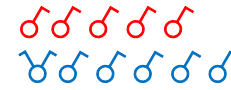
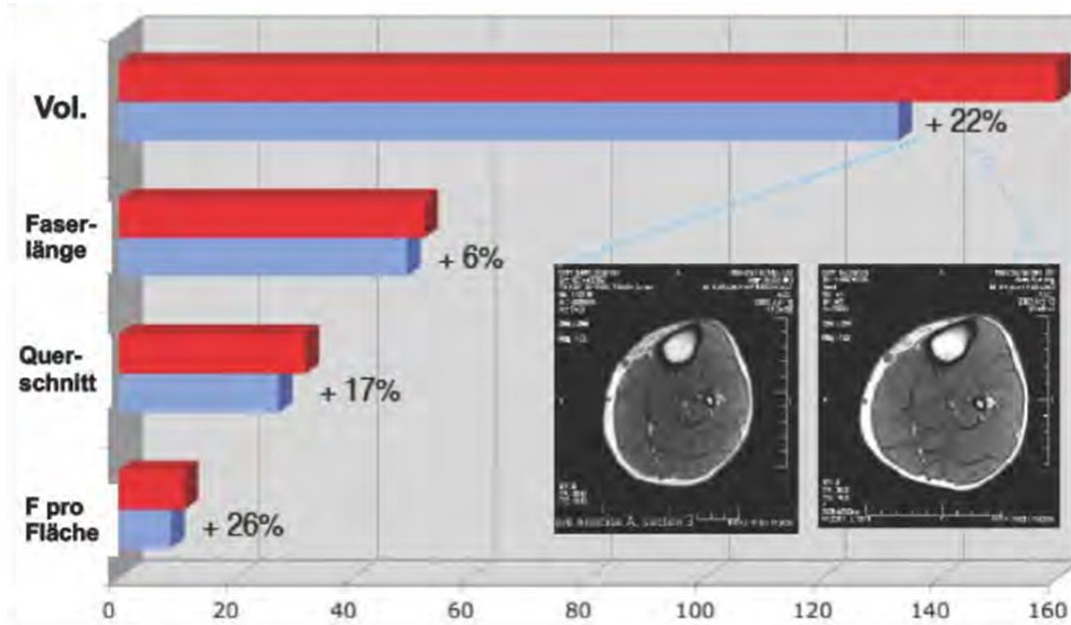
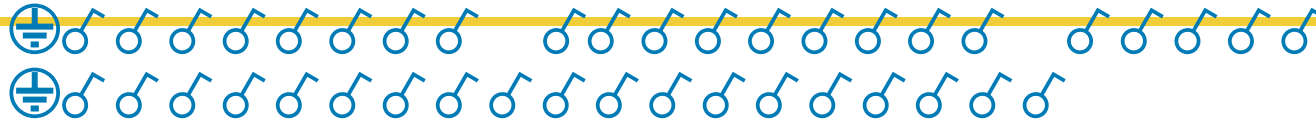
nach 35d: 5.136

Muskelmasse-Abbau = Abbau von Sarkomeren!



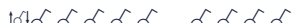
n.b. average no of sarcomeres in-series lost: ~3360 after 10 days (from 38954 to 35590) and 5136 after 35 days of BR (from 38954 to 33818), assuming a resting VL sarcomere length of 2.20 μm (Wickiewicz et al. *Clin Orthop Relat Res* 179, 275-283, 1983).







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1.

**Koordination /
Propriozeption**

- optimaler Einsatz der vorhandenen Kraft bzw. Muskulatur

2.

Tonussteigerung

- im ermüdeten Zustand gut tonisiert weiterbewegen

3.

Hypertrophie

- Zunahme des Ruhetonus aufgrund Zuwachs parallel Sarkomere

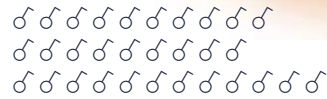
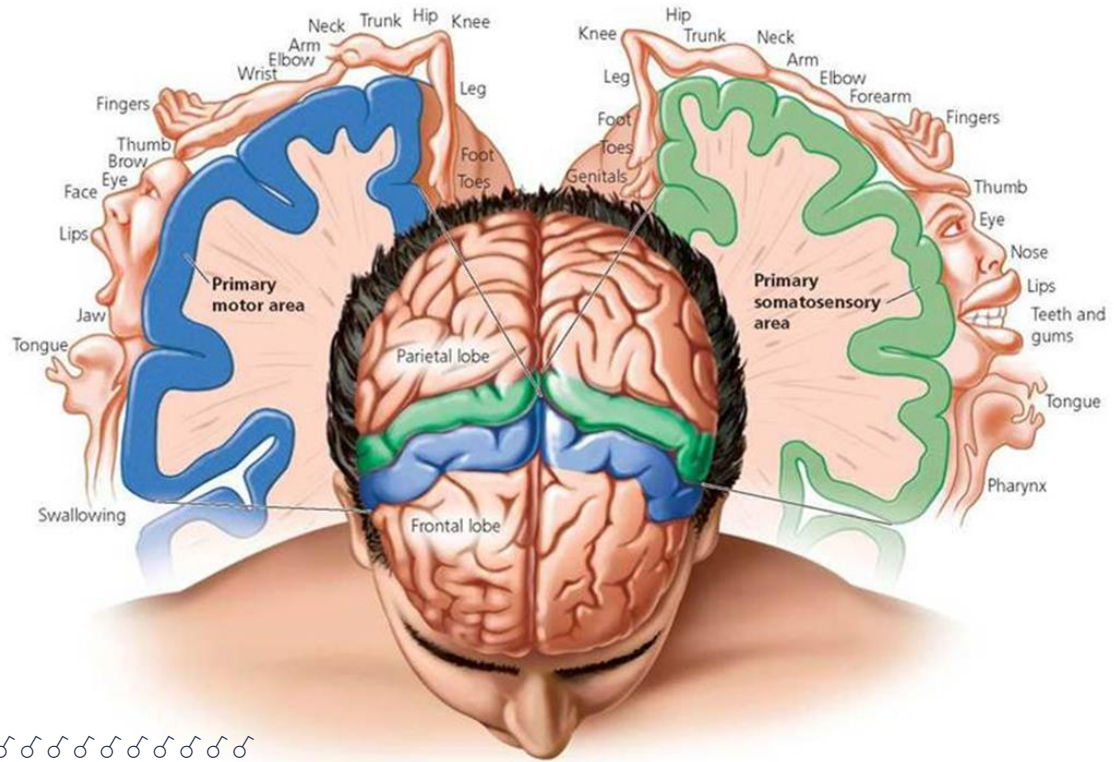
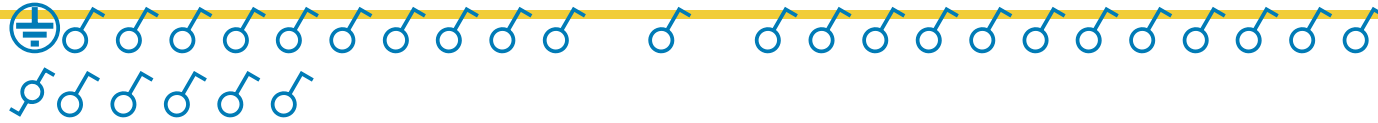


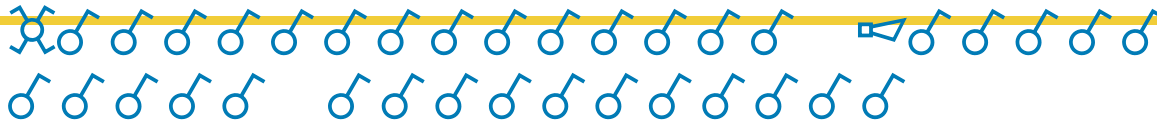


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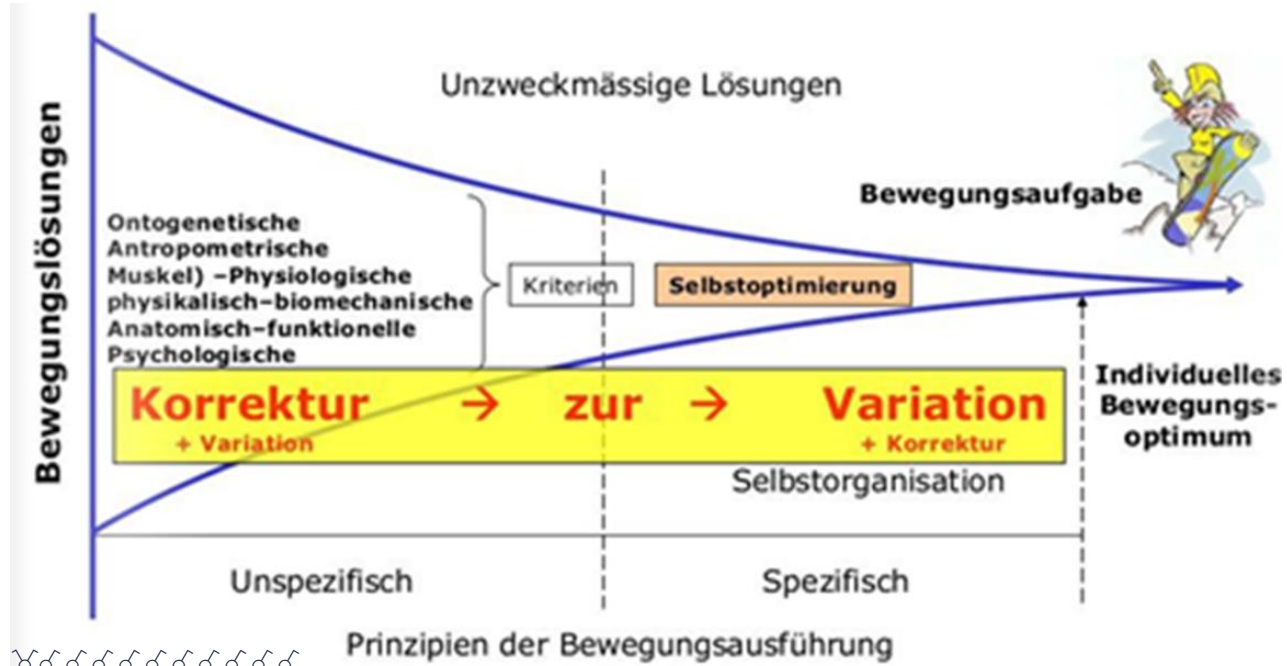
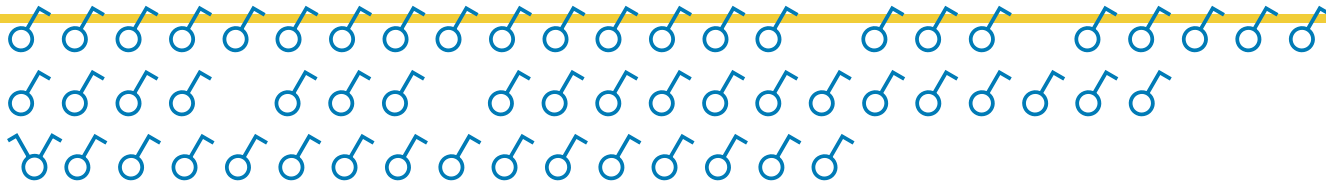




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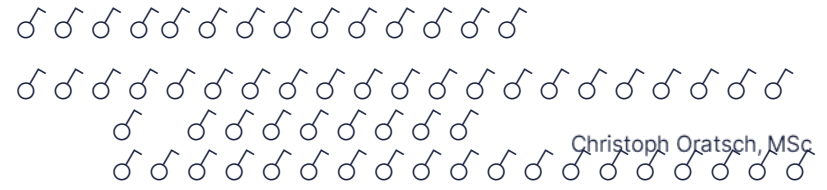
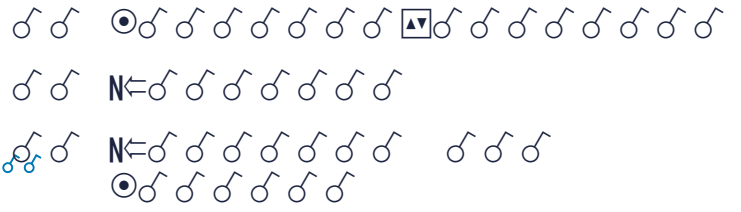
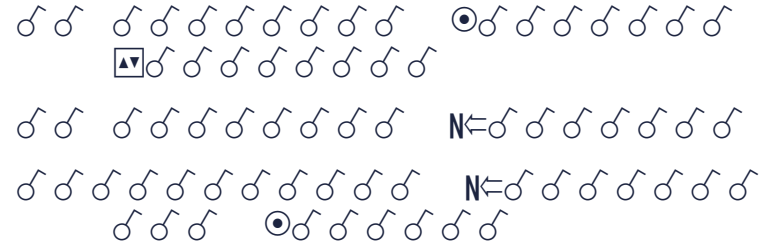
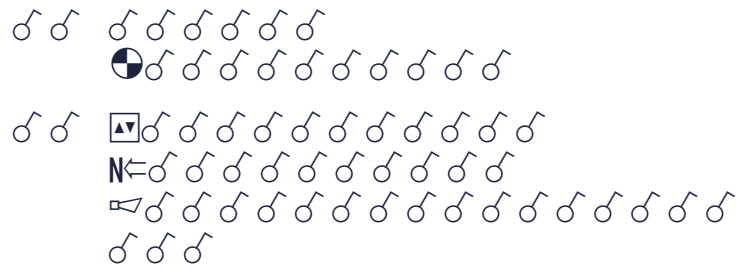
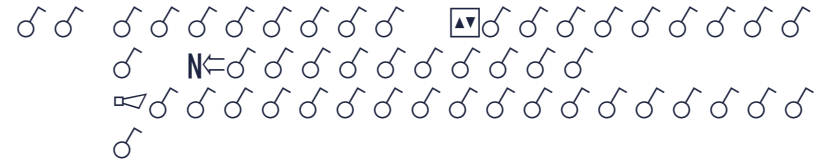
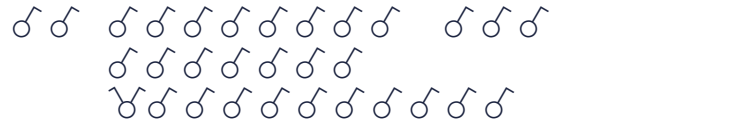
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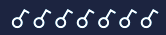
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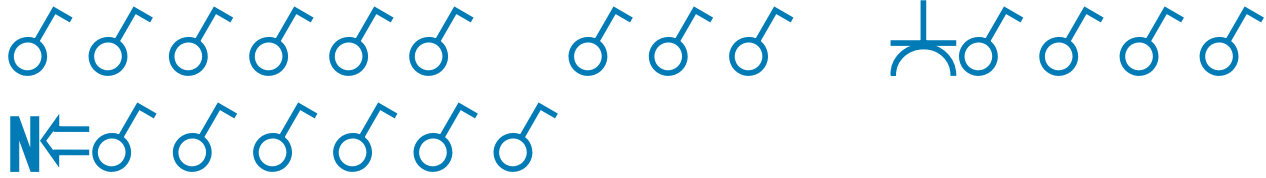


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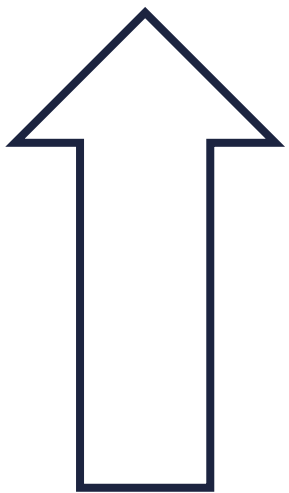




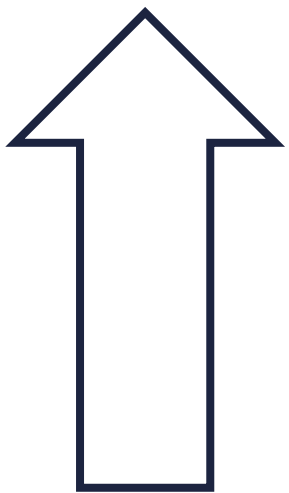




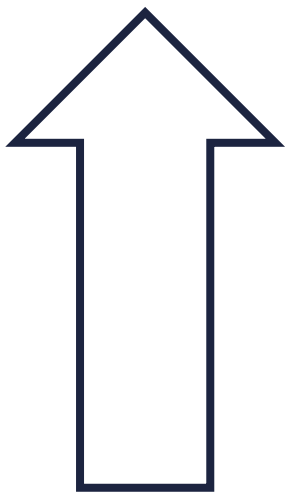
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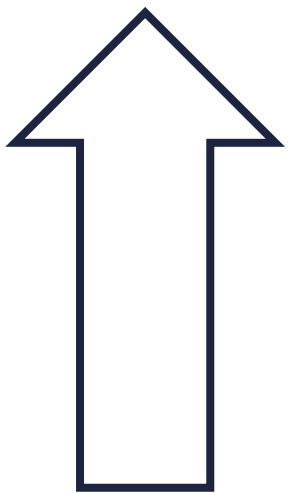


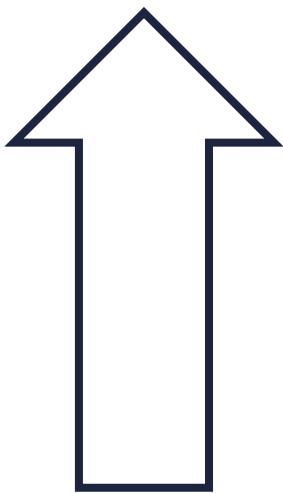


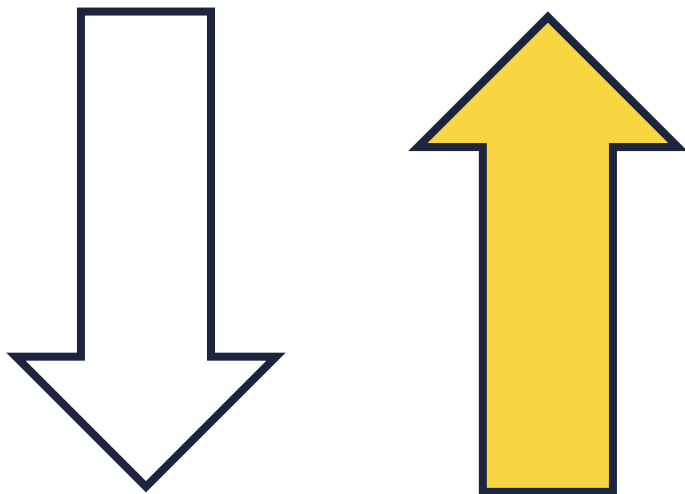


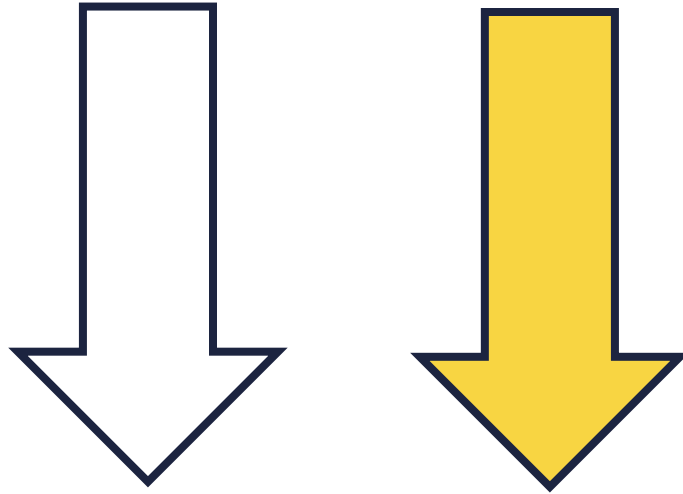


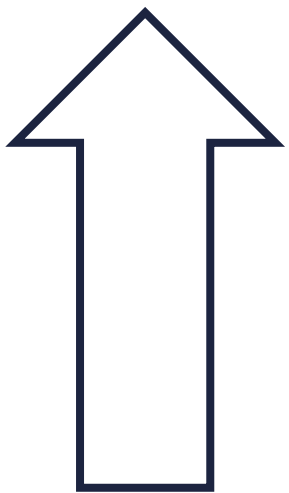






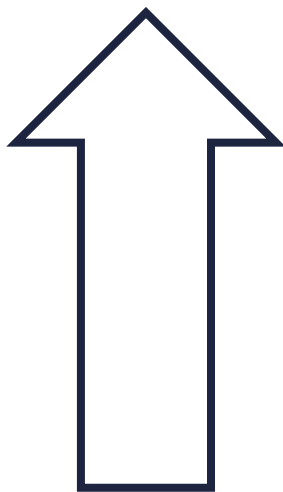


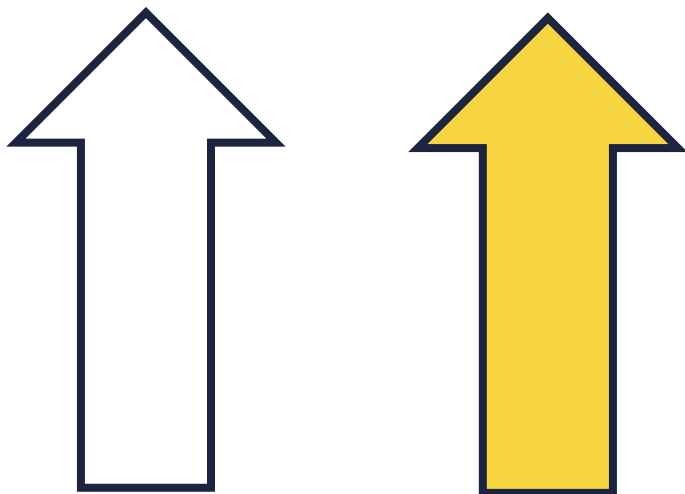


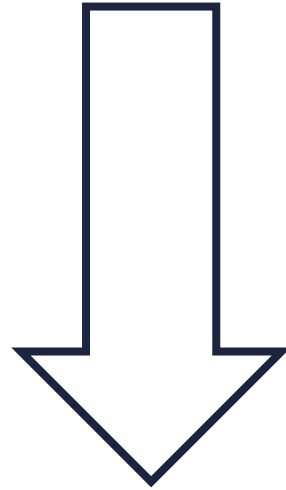


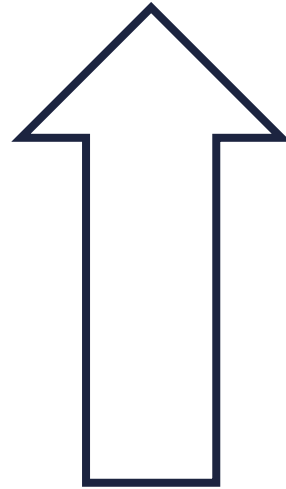


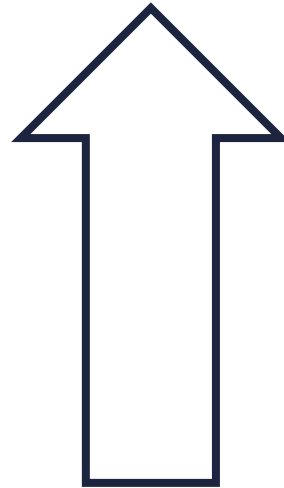


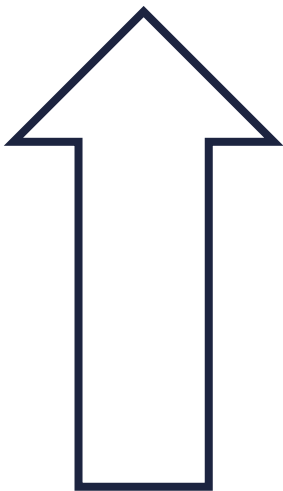


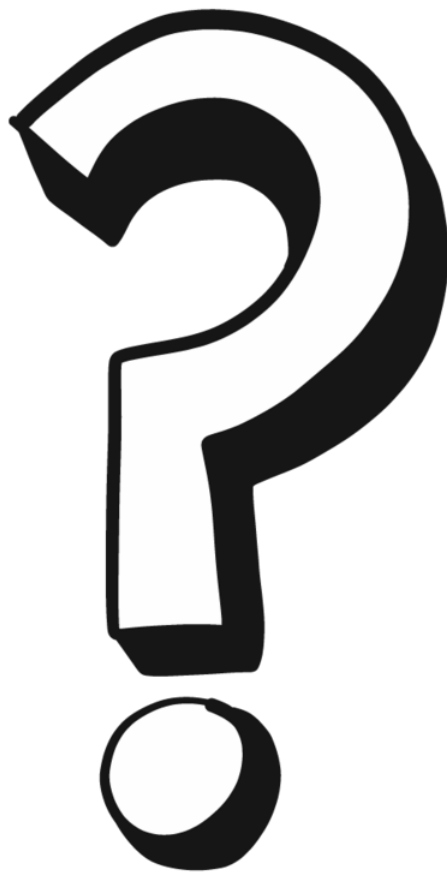


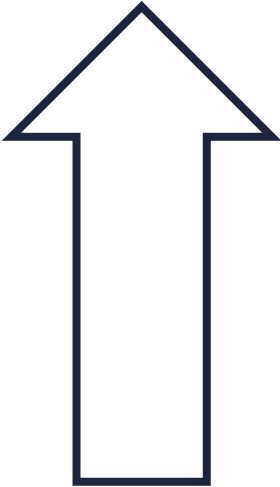


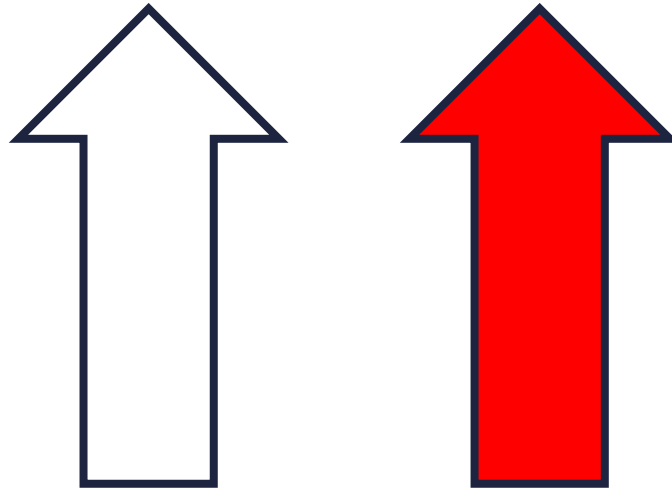




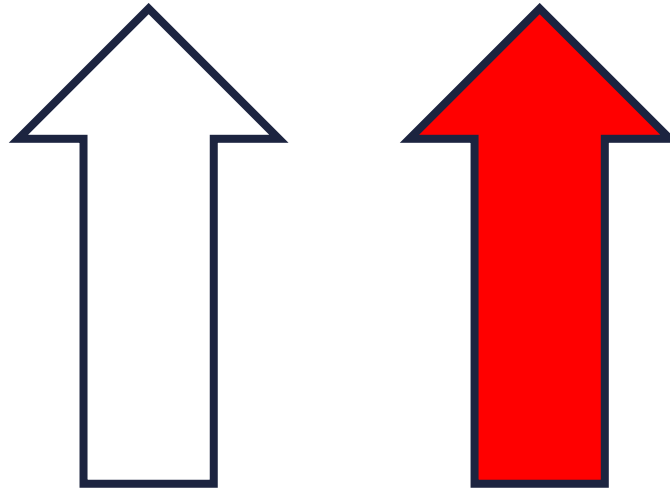


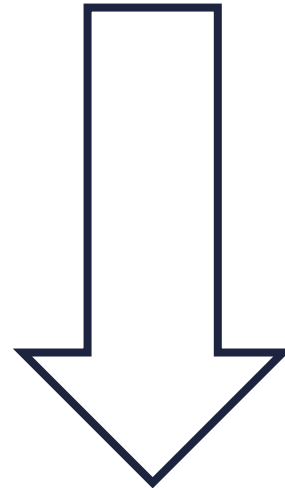
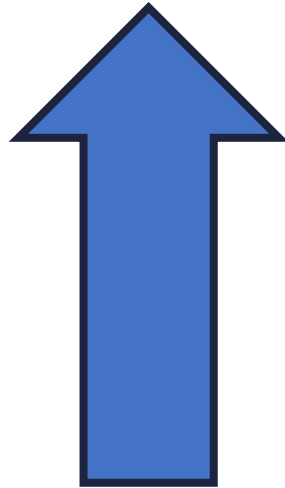


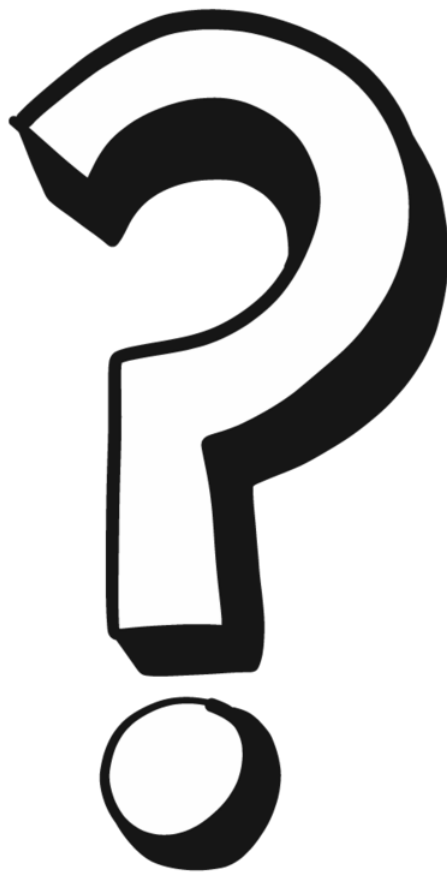


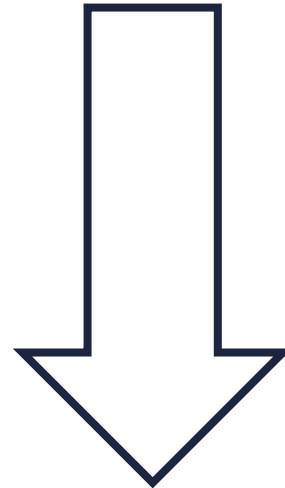
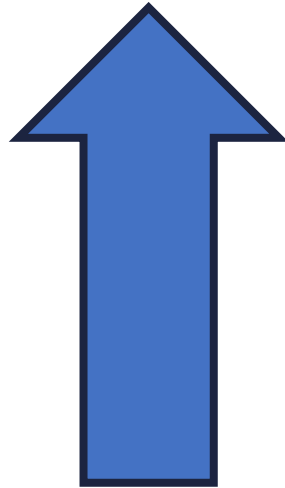






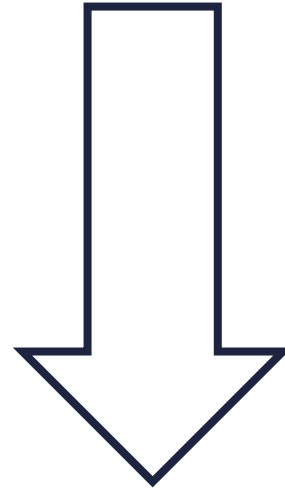


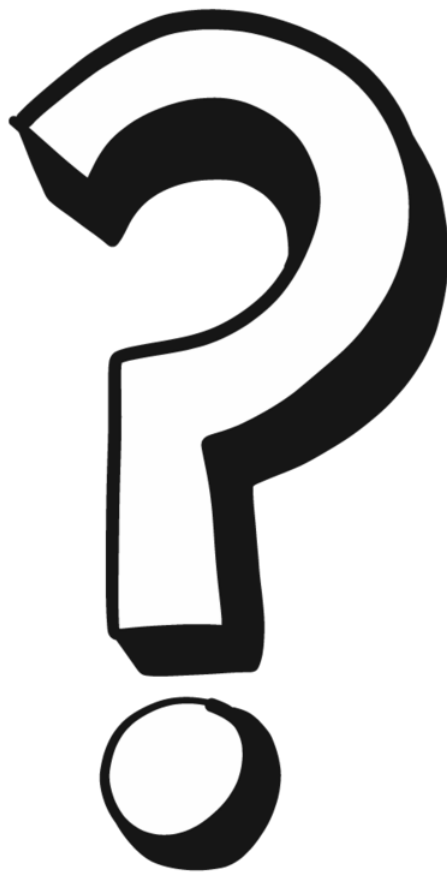






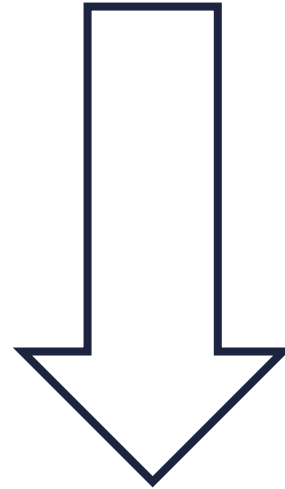
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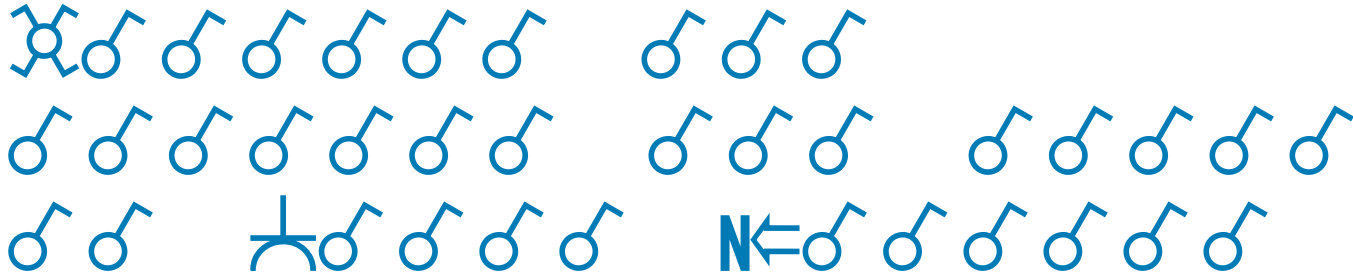




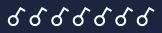


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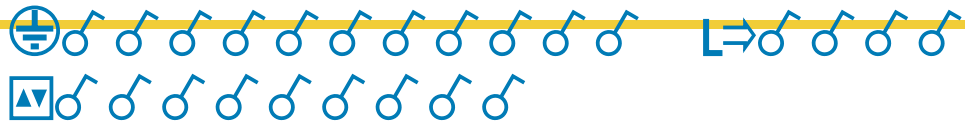
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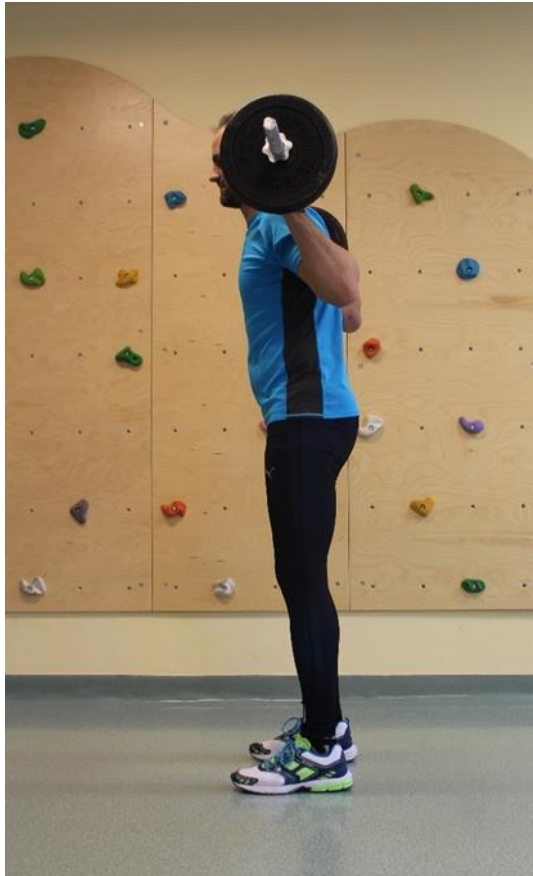
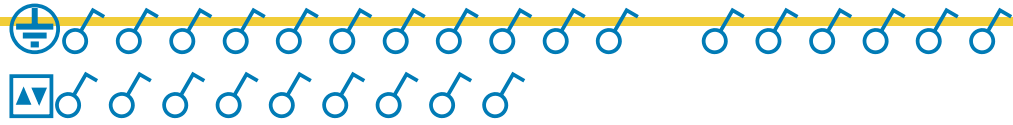
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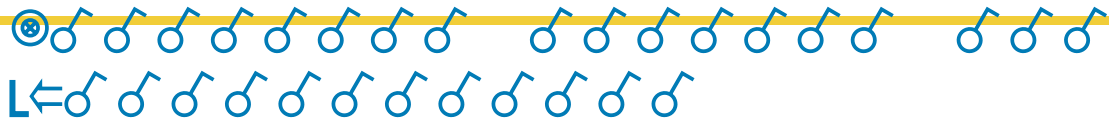


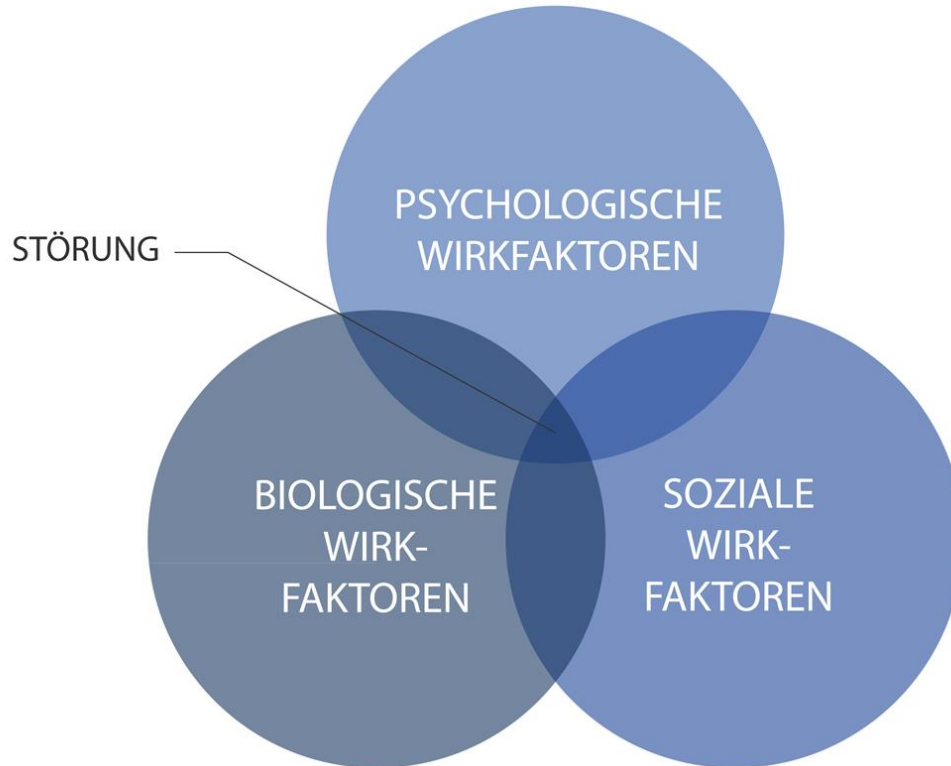


Belastungsintensität in %	Wiederholungszahl
100	1
95	2
90	3-4
85	5-6
80	7-8
75	9-10
70	11-13
65	14-16
60	17-20
55	21-24
50	25-30

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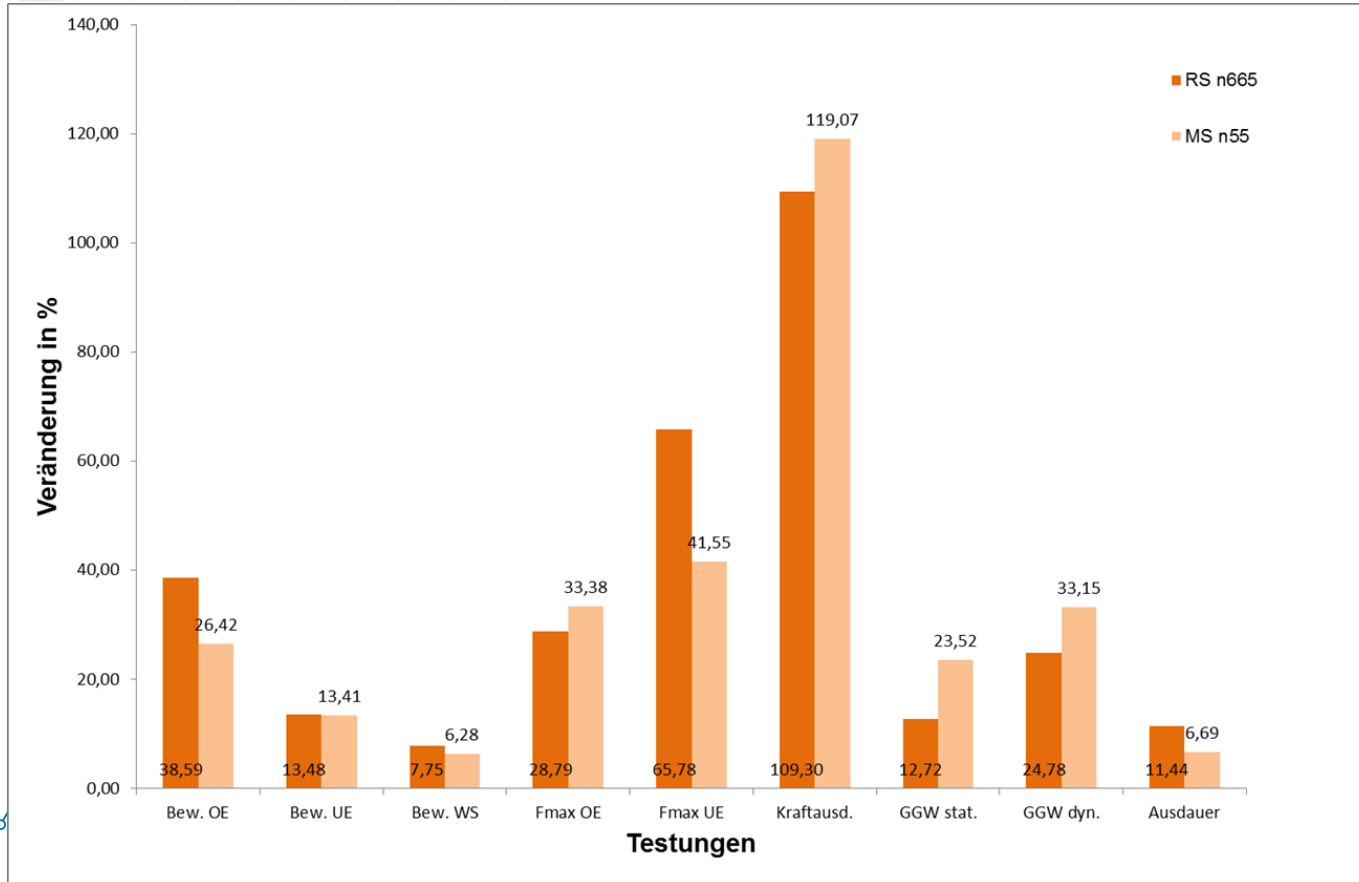


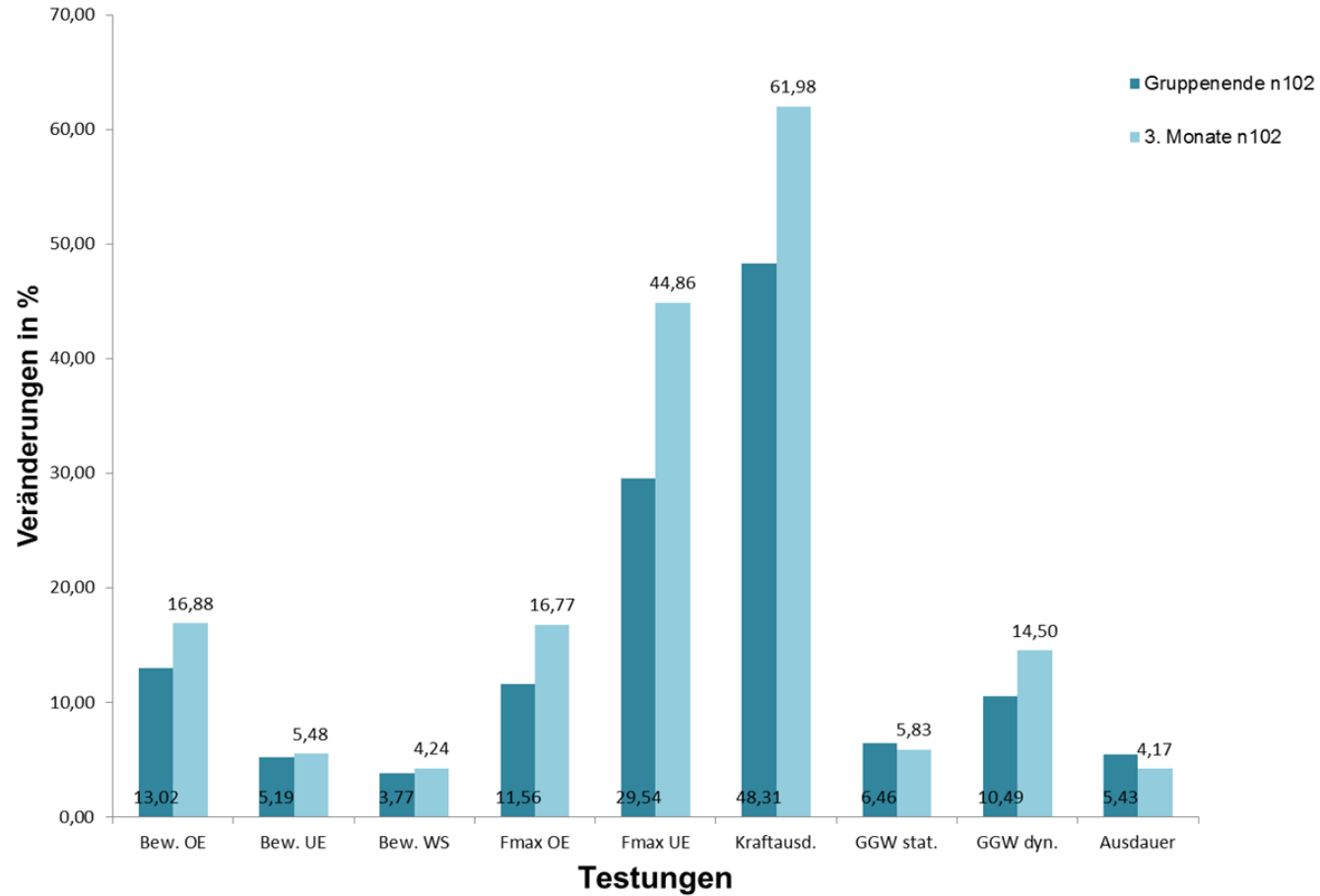
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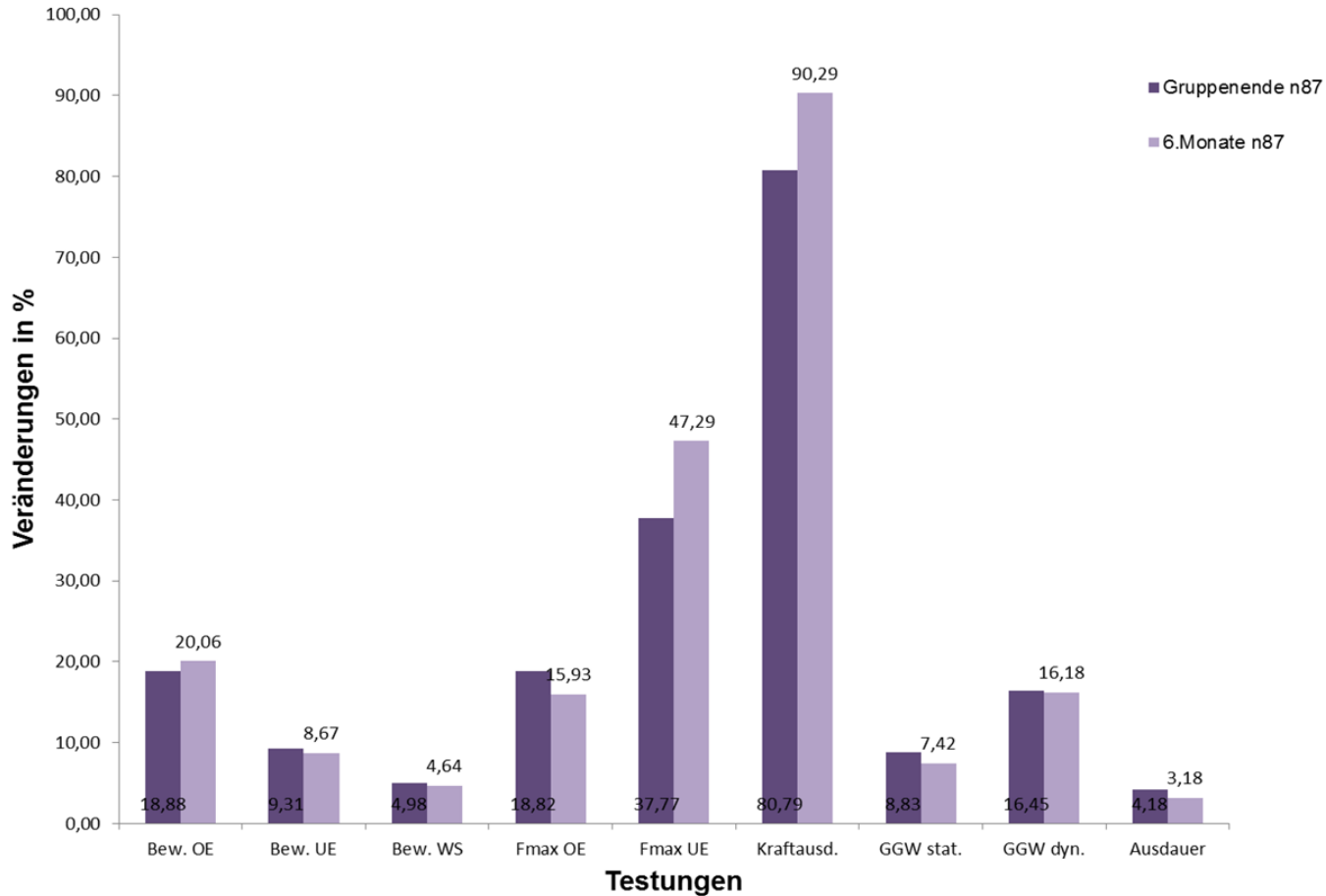
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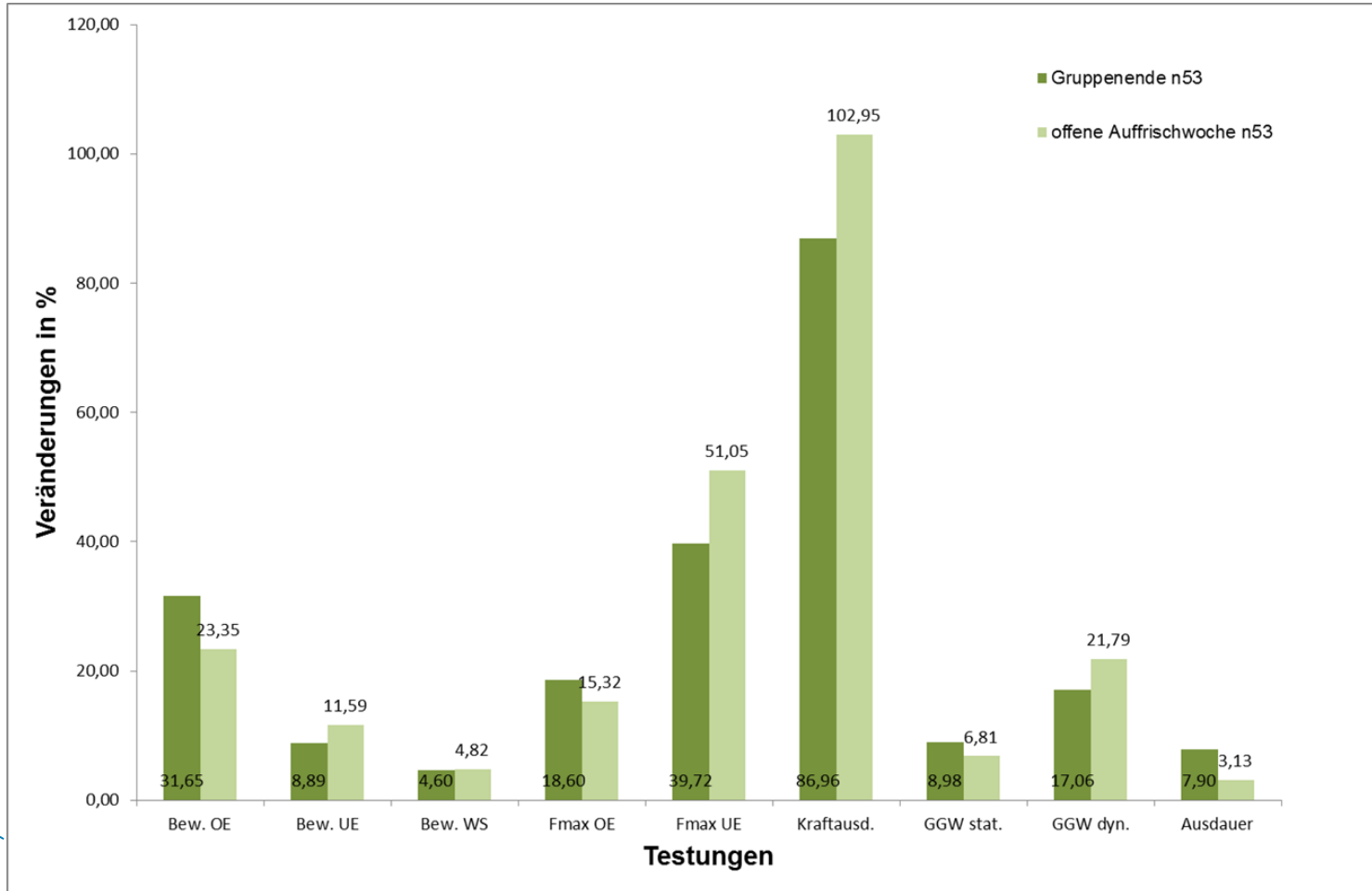




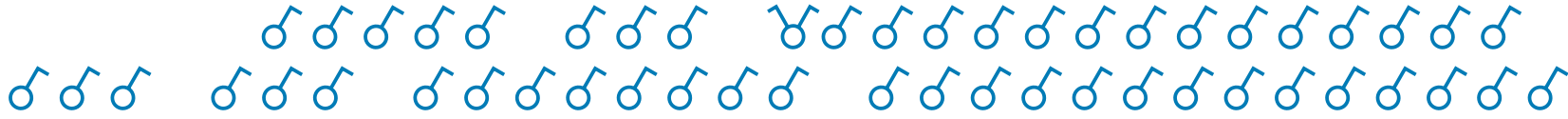
Tabelle: Korrelation der körperlichen Werte und der Schmerzempfindungsskala (SES) bei n=377

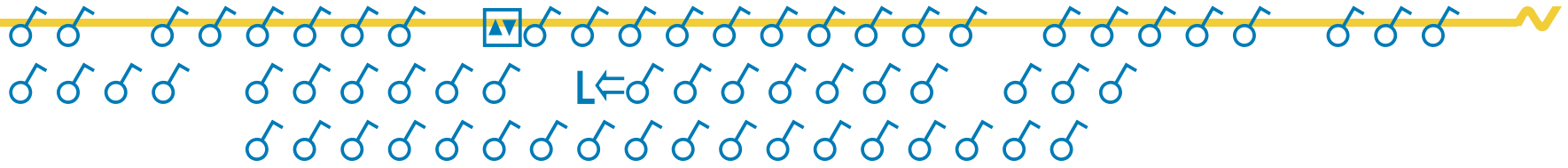
		SES-a (Pkt)	SES-s (Pkt)
Side Raises (kg)	Korrelation nach Paerson	-0,500	-0,137
	Sign. (2-seitig)		0,008
Butterfly (kg)	Korrelation nach Paerson	-0,570	-0,138
	Sign. (2-seitig)		0,007
Squats (kg)	Korrelation nach Paerson	-0,134	-0,205
	Sign. (2-seitig)	0,009	<0,001
Bridging re aufg. (sec)	Korrelation nach Paerson	-0,116	-0,132
	Sign. (2-seitig)	0,024	0,011
Bridging li aufg. (sec)	Korrelation nach Paerson	-0,141	-0,138
	Sign. (2-seitig)	0,006	0,007
UA-Stütz (sec)	Korrelation nach Paerson	-0,172	-0,219
	Sign. (2-seitig)	0,001	<0,001
Ausdauer (Watt/kg KG)	Korrelation nach Paerson	-0,061	-0,126
	Sign. (2-seitig)		0,015

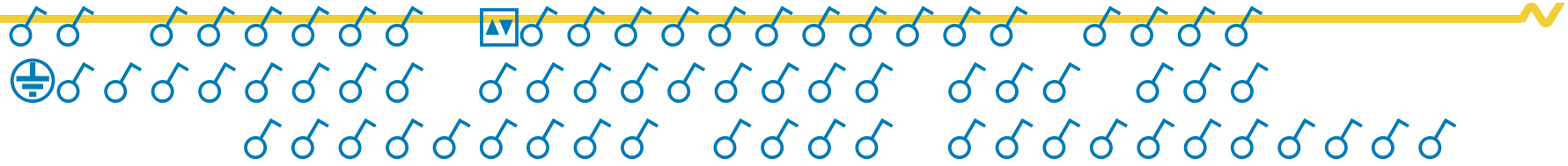
SES-a= SES-affektiv; SES-s= SES-sensorisch













Empfohlenes Bewegungspensum pro Woche



150 min leicht bis moderat








75 min moderat bis intensiv







2x Kraft- / Koordinationstraining

Quelle: WHO | Fitseat.de



- \setminus 
 - 
- 
 - 
 - 





- \setminus 
 - 
- 
 - 

- 
 - $L \leftarrow$ 

- \otimes 
 - \setminus 



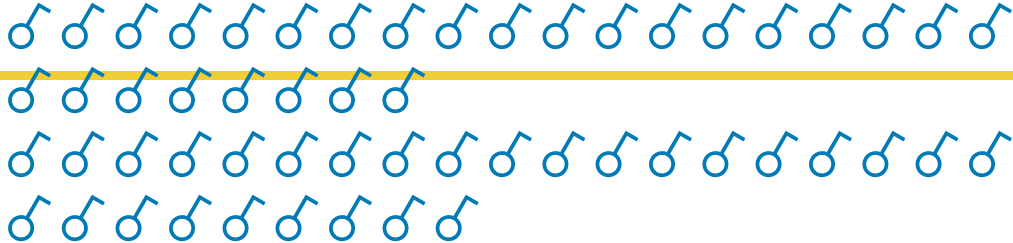
- 

- $N \leftarrow$ 
- 



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- $t \uparrow$ ♂♂♂♂♂♂
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DIGITALE FITNESSGERÄTE MIT ECHTZEIT-KORREKTUR



FEEDBACK IN ECHTZEIT

- Die integrierte 2D Full-HD Kamera erfasst 25 Gelenkpunkte
- Virtueller Personal Trainer zeigt Übungen am Display
- Textliches und visuelles Feedback am Bildschirm
- Die patentierte Station liefert personalisiertes Feedback während & nach den Übungen





Kleingeräte



Kein Kleingerät



Kurzhandeln



Bank



Medizinball



Box



Fitnessband



Kettlebells



Gymnastikball



Langhantel



Stock



Wasserflasche



Gehbarren



Holzocker



Stuhl



Wand

Fokus

Angriff

Verteidigung

Erholung

Gleichgewicht

Kardio

Hohe Intensität

Isometrischer Halt

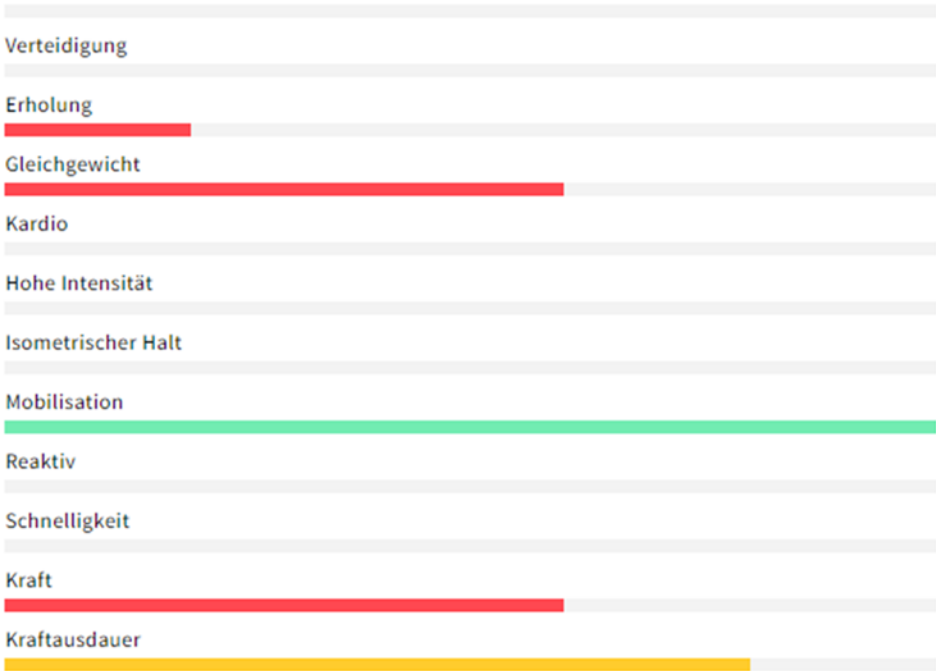
Mobilisation

Reaktiv

Schnelligkeit

Kraft

Kraftausdauer





- $N \leftarrow$ male symbols
- \sim male symbols
- male symbols \uparrow male symbols
- \ominus male symbols
- male symbols \uparrow \oplus male symbols \uparrow \sim $N \leftarrow$ \ominus male symbols





♂♂♂♂♂♂



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Christoph Oratsch

