





Low back pain in Sports

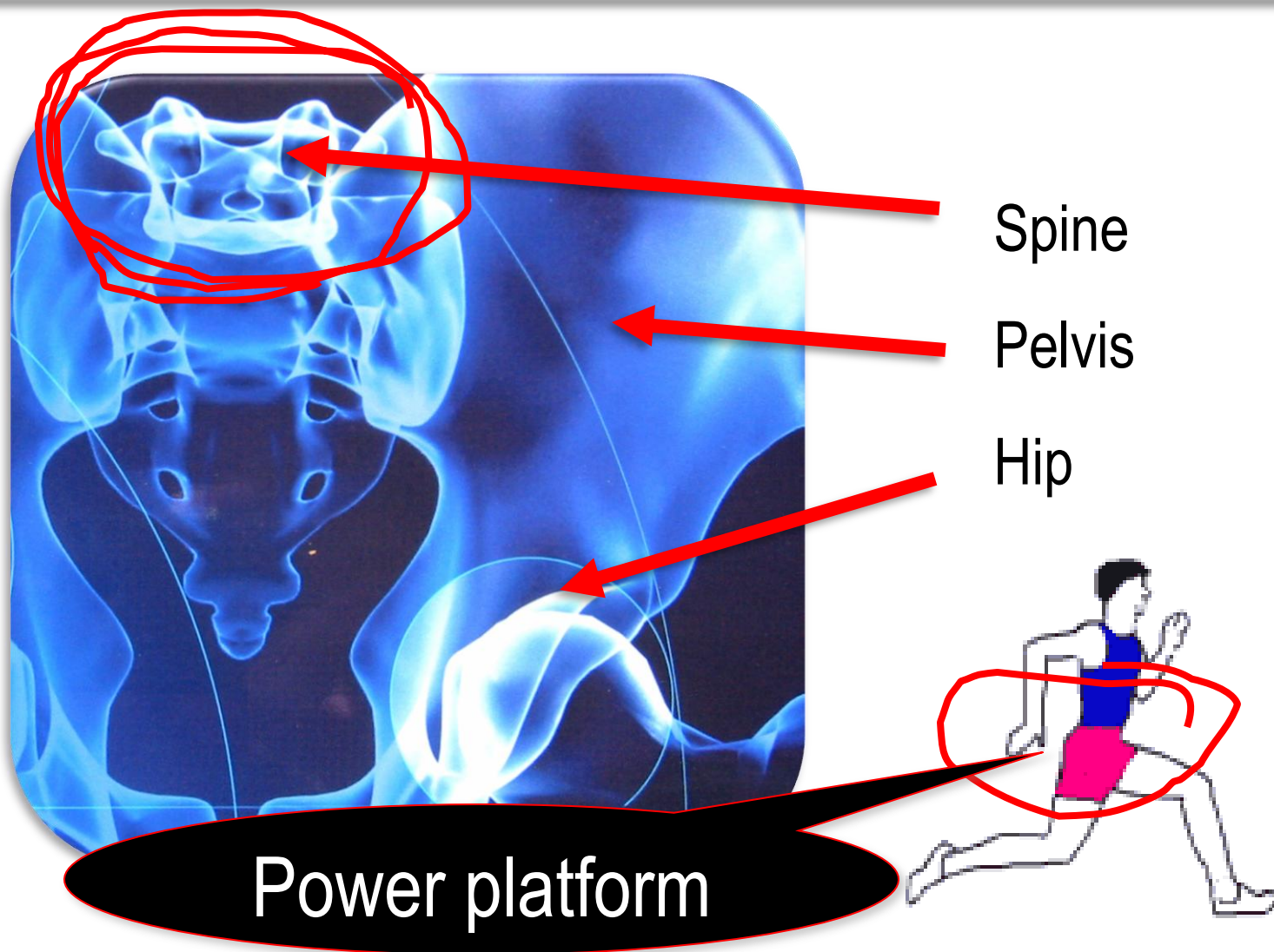
1. Sports Medicine Seminar KHL
Leukerbad 6.5.2010

Dr. med. Hans Spring

CMO Rehasentrum Leukerbad
Swiss Olympic Medical Center Leukerbad
Sportmed Swiss Ski



Functional unit: Spine / Pelvis / Hip

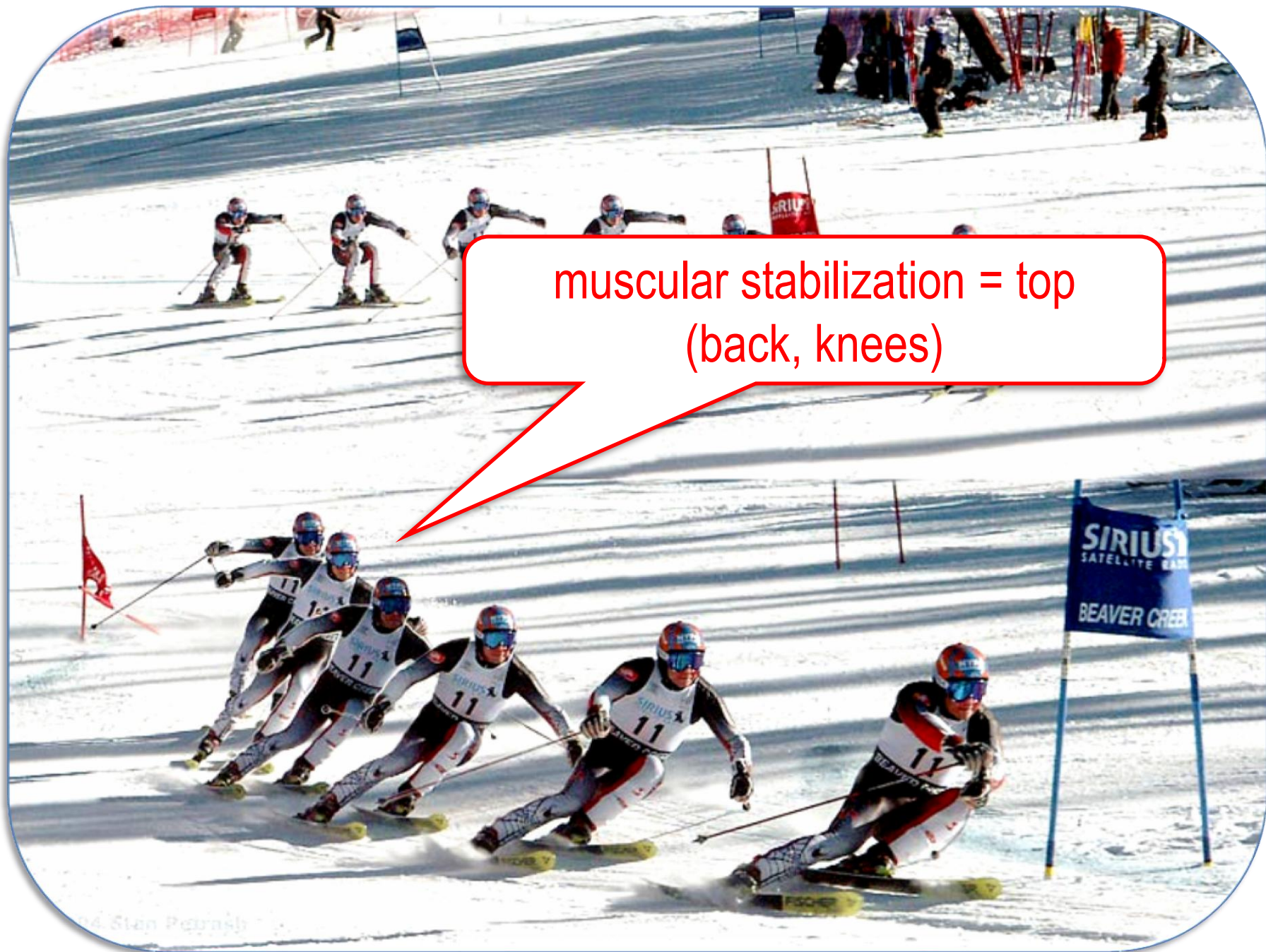


Spine

Pelvis

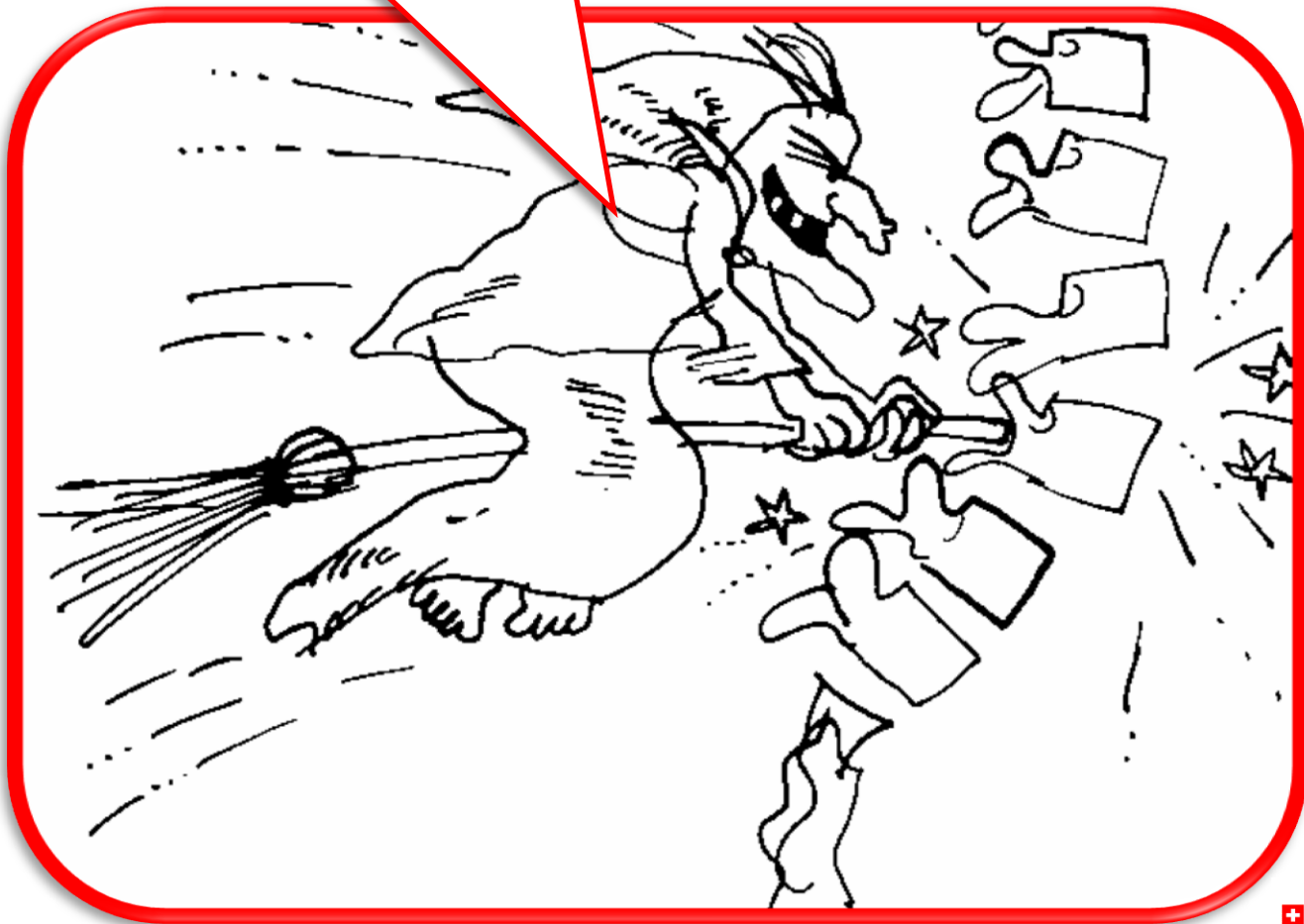
Hip

Power platform

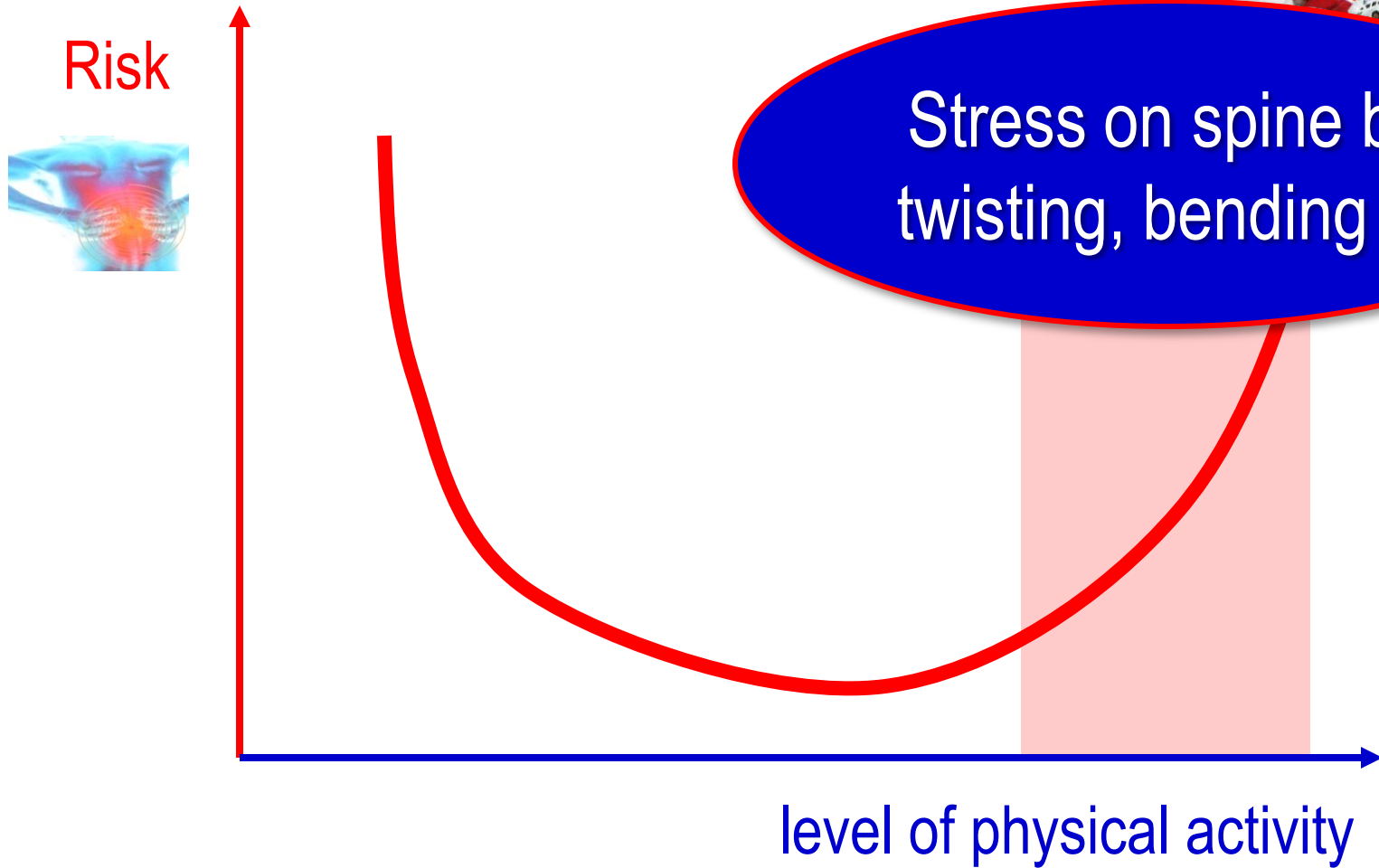


muscular stabilization = top
(back, knees)

if not ...



Risk of low back pain



Capabilities

Physical demands



= fix

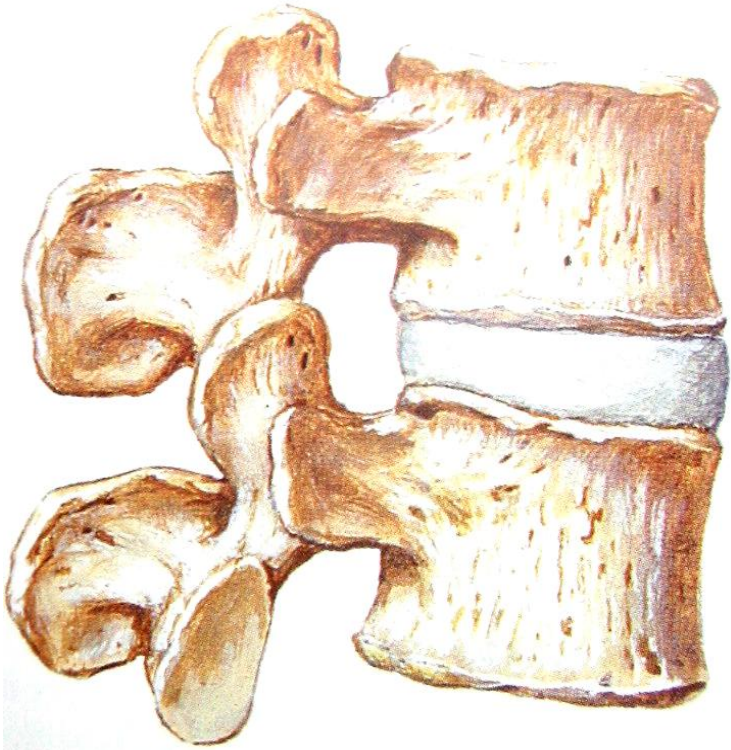
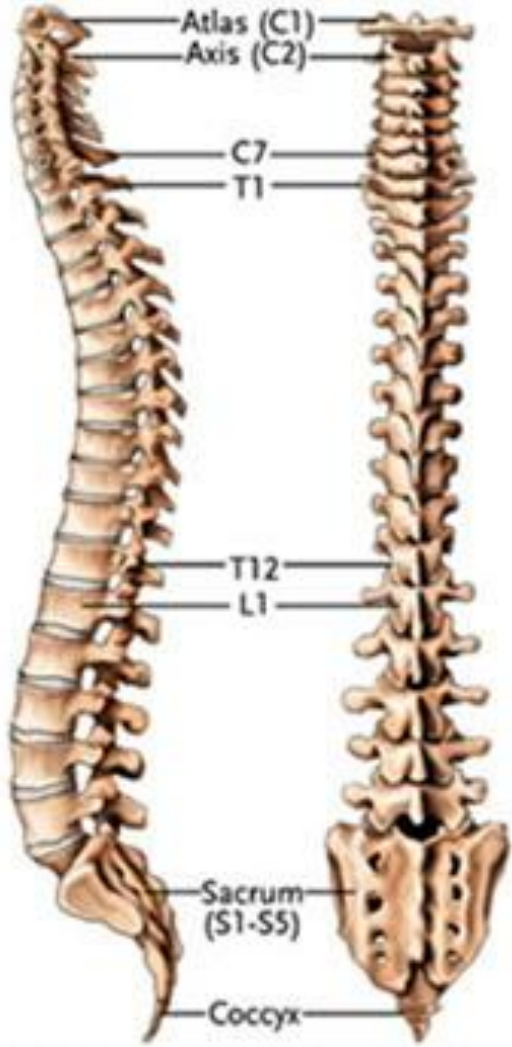


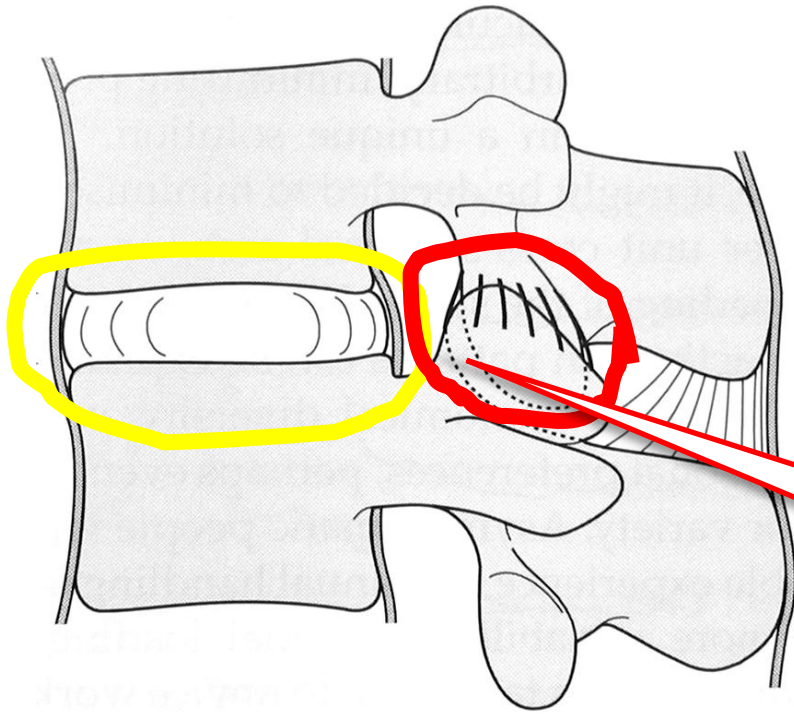
What to know? What do do?



Back muscles:
local system
global system

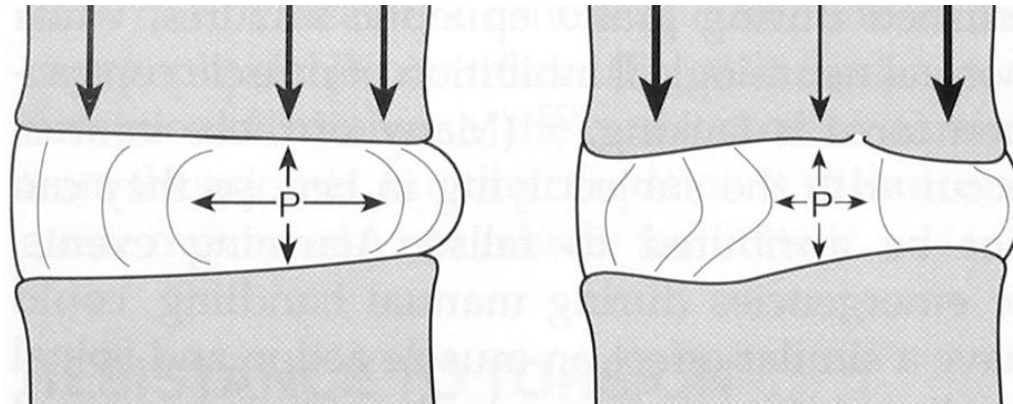
our
hardware!



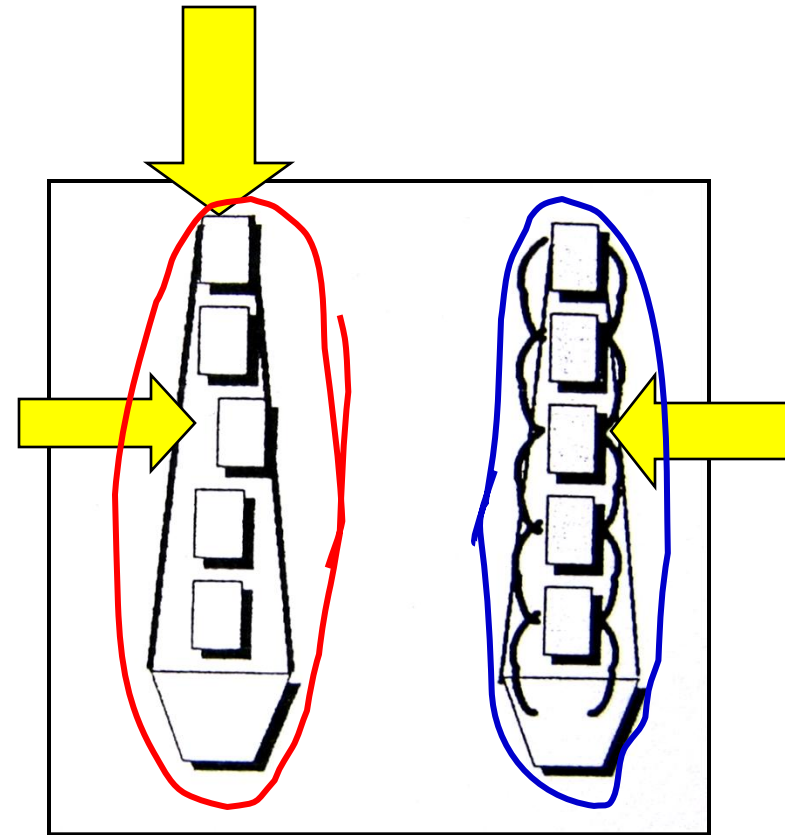
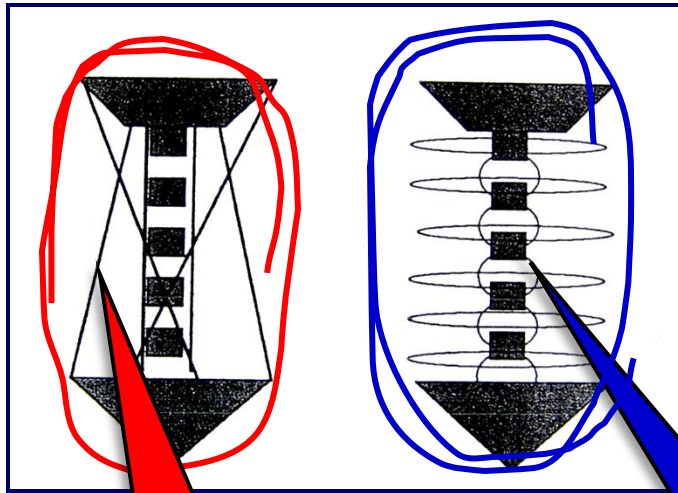


Functional unit

Stabilisation by local muscles



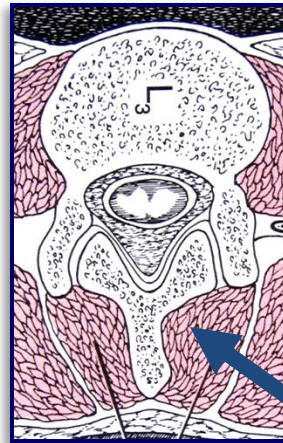
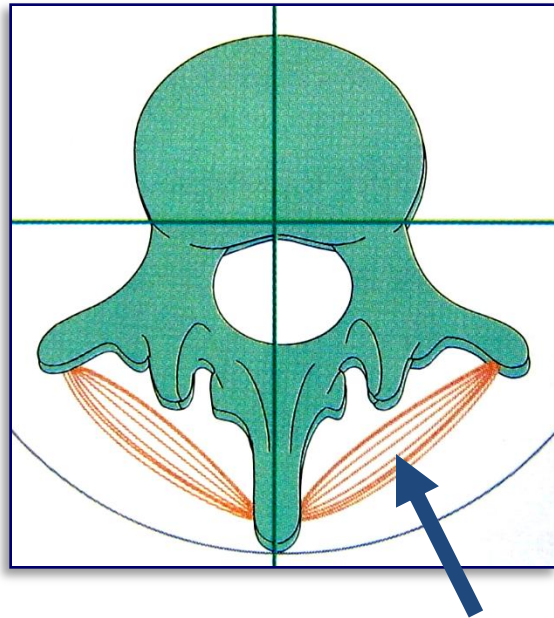
global and local system



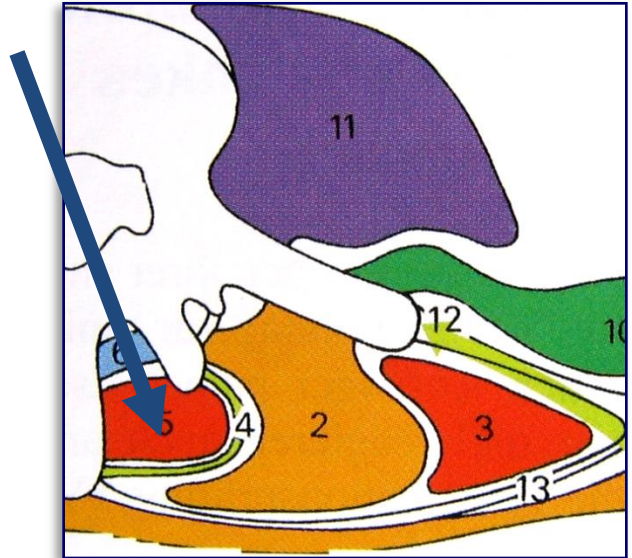
global mobility
muscles

local stability
muscles

local system



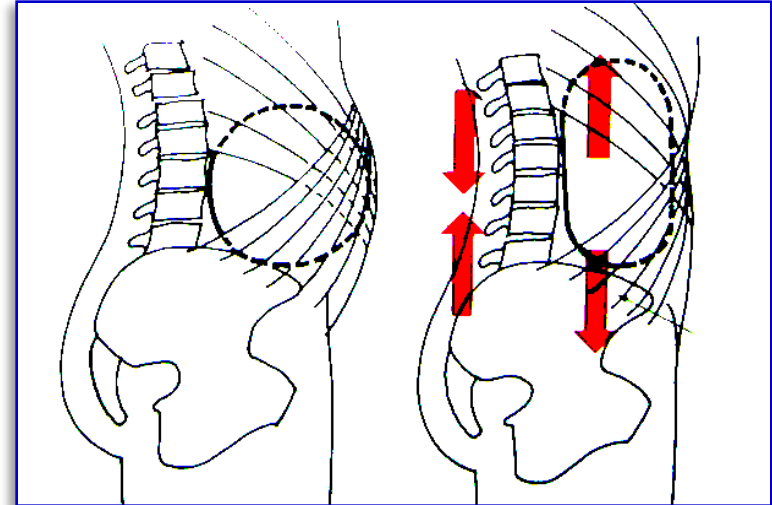
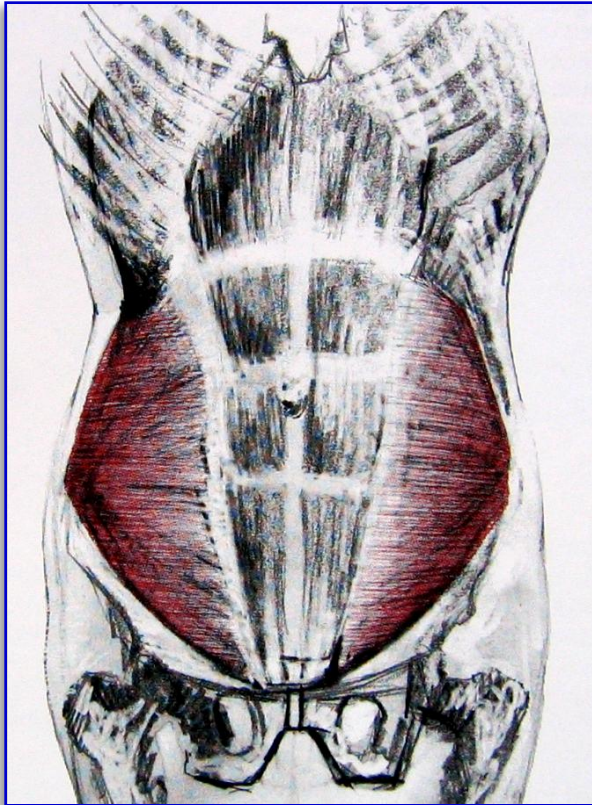
m. multifidus



- ✓ small, close to the spine
- ✓ slow twitch > fast twitch
- ✓ 58-80% of segmental stability by m. multifidus

local system

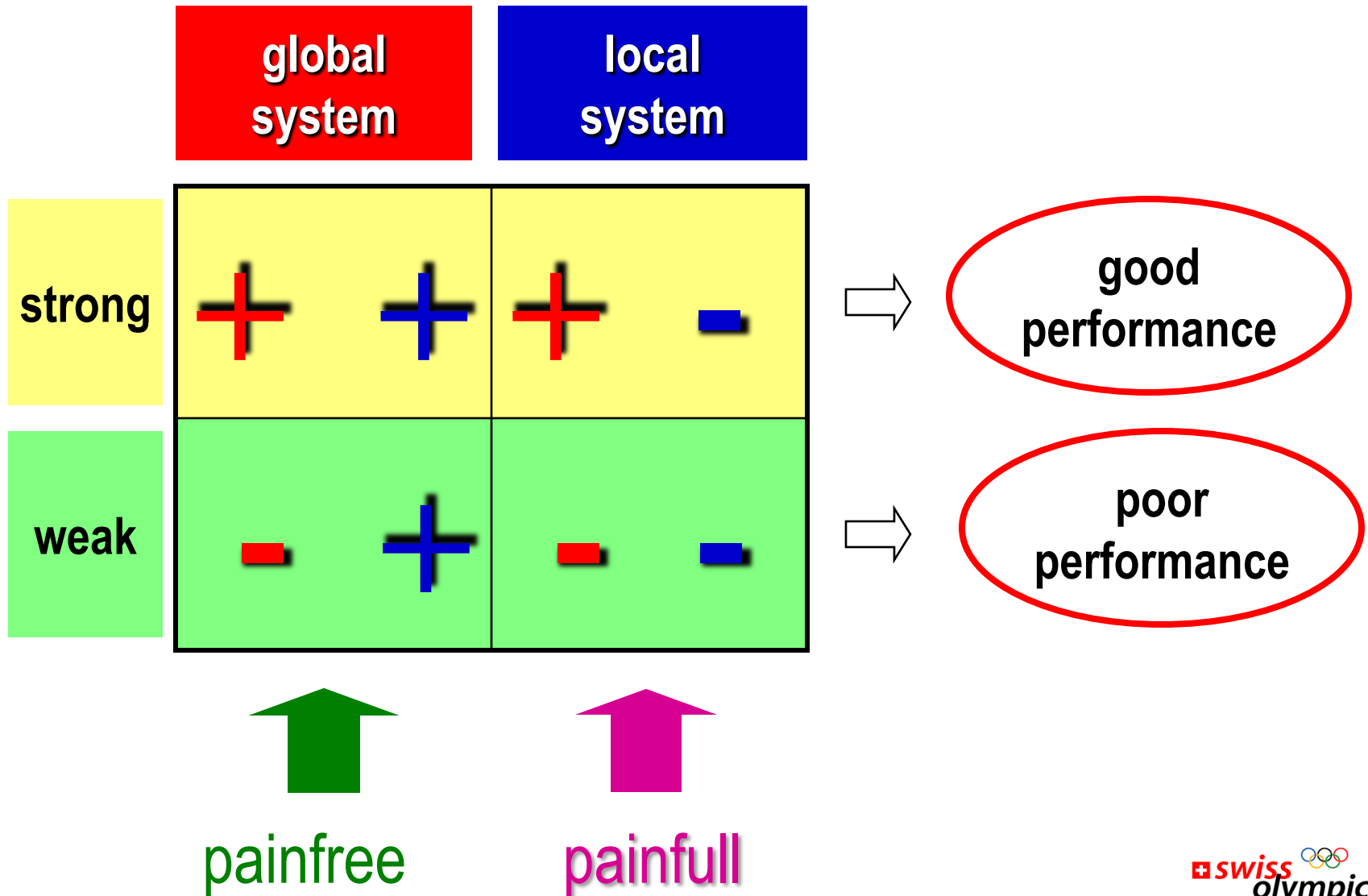
m. transversus abdominis



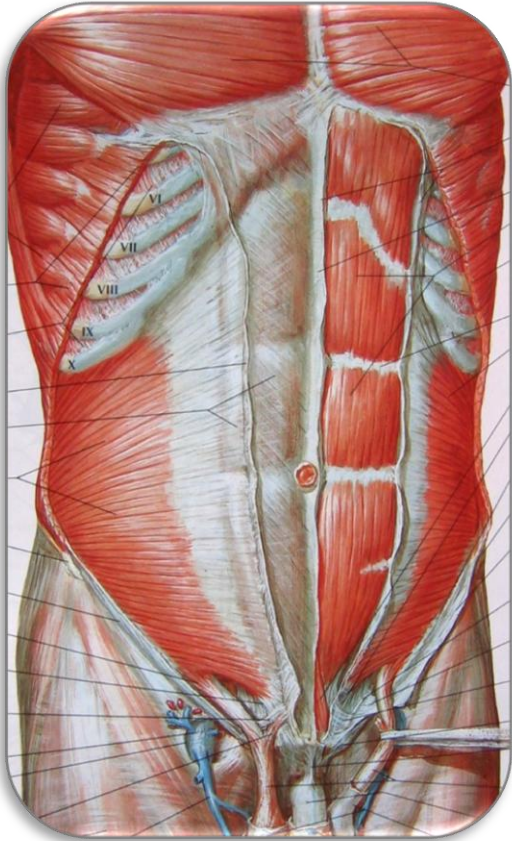
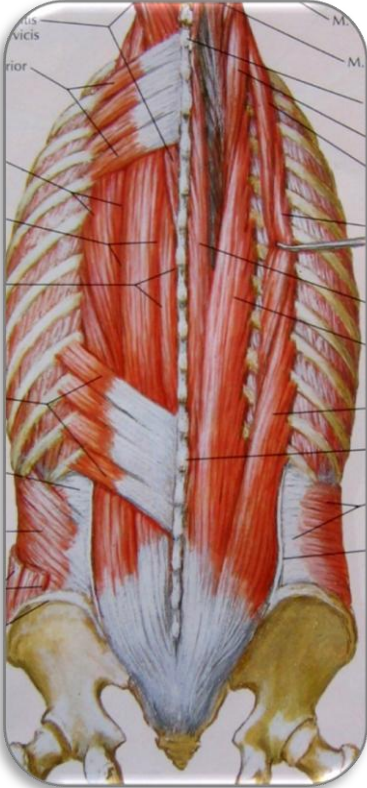
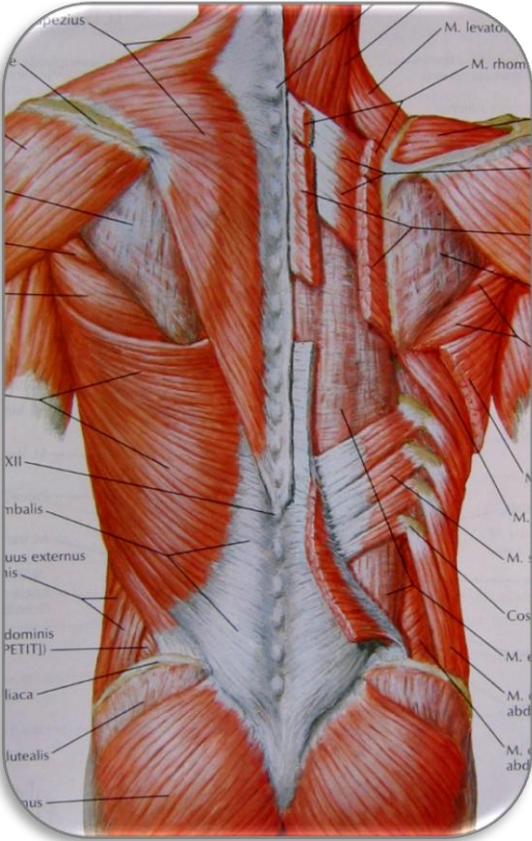
increased intraabdominal pressure
coworkers:

- ✓ m. multifidus,
- ✓ diaphragme
- ✓ pelvic floor muscles

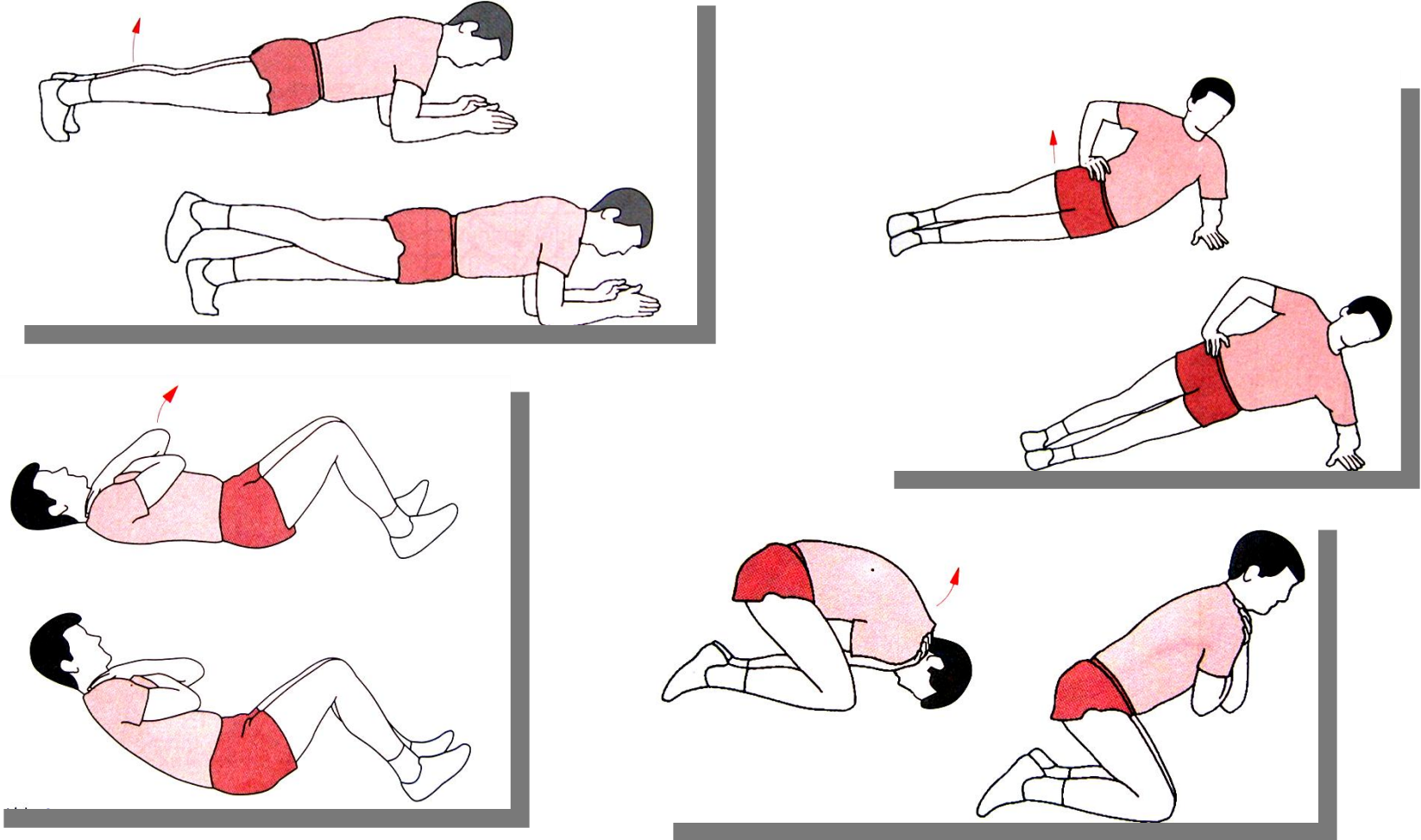
Stabilization of the spine



global system



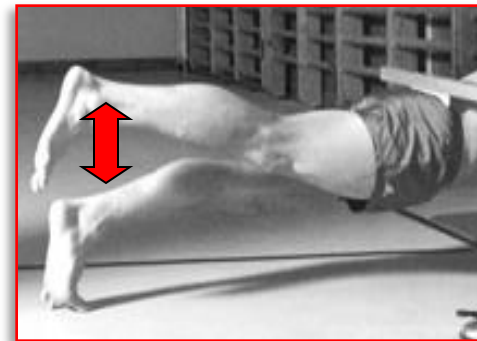
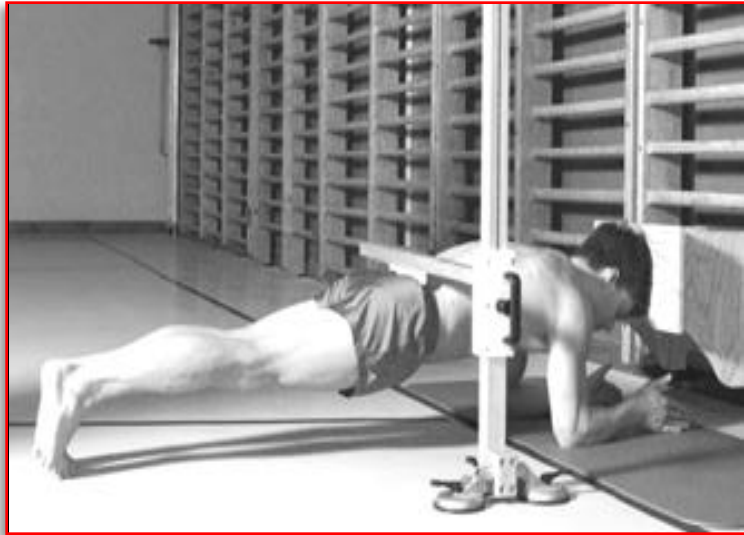
Muscle testing:



Strength?

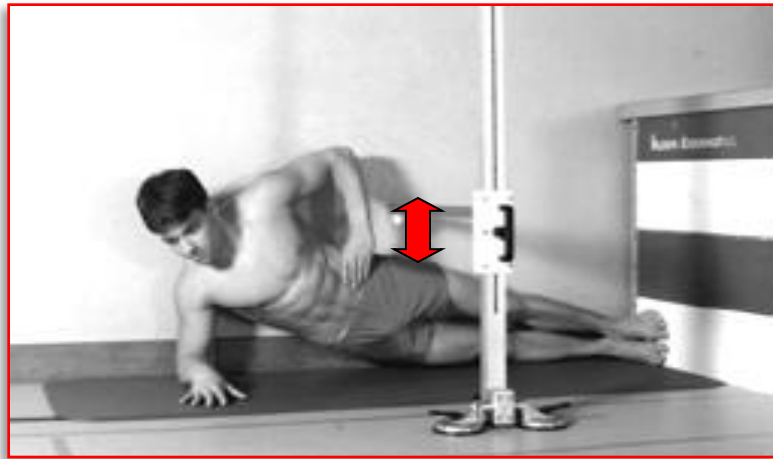
Strength tests Swiss Olympic

1. ventral



Strength tests Swiss Olympic

2. lateral



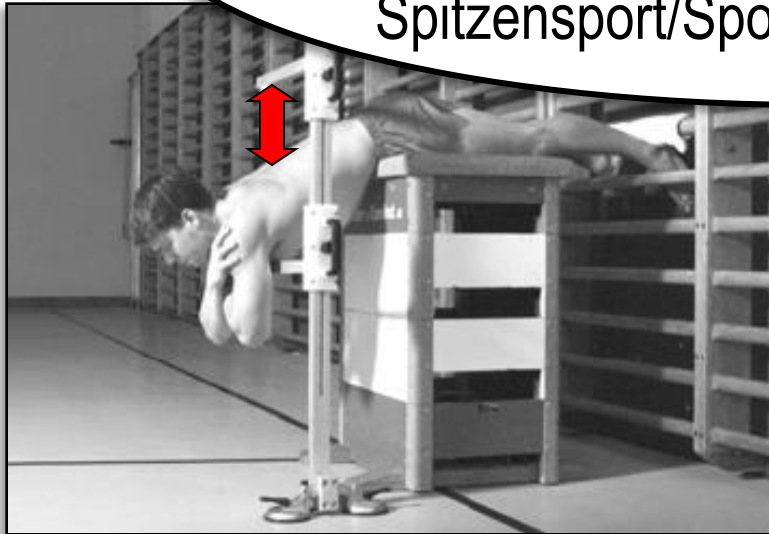
Strength tests Swiss Olympic

3. dorsal

manuals

www.swissolympic.ch

Spitzensport/Sportmedizin/Downloads



Comparaison entre disciplines sportives – Test de la force du tronc (28)

Sportart	Grösse	Gewicht	Alter	Ventrale Rumpfkette			Laterale Rumpfkette			Dorsale Rumpfkette		
				Mittelwert	Max	Min	Mittelwert	Max	Min	Mittelwert	Max	Min
Kunstturnen (5)												
Kollektivmittelwert	1.73	66.8	20.01	239	349	183	133.8	173	96	98.4	130	66
Standardabweichung	0.04	5.36	0.9	66.76			28.67			22.88		
Kanu (6)												
Kollektivmittelwert	1.79	74.33	21.2	244	388	166	106.83	180	68	112.5	149	82
Standardabweichung	0.07	7.71	0.81	85.99			43.69			23.74		
Ski-Langlauf/Biathlon (16)												
Kollektivmittelwert	1.82	72.34	20.62	178.38	265	82	94.81	128	72	147.94	200	101
Standardabweichung	0.06	6.68	0.66	48.79			16.59			28.65		
Kampfsportarten (13)												
Kollektivmittelwert	1.75	76.5	20.49	159.08								
Standardabweichung	0.07	17.82	0.97	46.32								
Ski alpin (16)												
Kollektivmittelwert	1.81	82.59	21.26	182.6								
Standardabweichung	0.04	4.77	0.75	52.9								
Unihockey (6)												
Kollektivmittelwert	1.81	75.67	20.9									
Standardabweichung	0.05	4.84										
Sonstige (41)												
Kollektivmittelwert	1.84	75.87	20.52									
Standardabweichung	0.08	8.41	0.87									
Orientierungslauf (12)												
Kollektivmittelwert	1.78	67.12	20.34									
Standardabweichung	0.06	7.76	0.67									
Handball (23)												
Kollektivmittelwert	1.85	81.22	20.38	158.57								
Standardabweichung	0.06	7.8	0.88	50.59								
Leichtathletik (14)												
Kollektivmittelwert	1.83	77.43	20.75	139.36	252	97	92.57	200		169	71	
Standardabweichung	0.08	13.74	1.17	40.14			37.57			24.9		
Triathlon/Duathlon (11)												
Kollektivmittelwert	1.84	70.73	21.02	133.64	254	86	76.91	107	51	117.18	243	31
Standardabweichung	0.06	5.12	0.5	54.74			16.69			53.27		
Rad Strasse (11)												
Kollektivmittelwert	1.81	70.18	20.48	135.64	228	65	65.27	118	23	128.64	271	88
Standardabweichung	0.06	7.28	0.79	46.33			23.26			49.33		
Mountainbike/Radquer (10)												
Kollektivmittelwert	1.81	69.8	20.27	143.7	198	81	66.6	87	48	119.6	168	81
Standardabweichung	0.06	6.2	0.73	35.17			9.69			29.65		
Schwimmen (20)												
Kollektivmittelwert	1.84	72.78	20.39	131.85	178	73	85.15	143	54	102.6	150	68
Standardabweichung	0.05	5.89	0.87	35.9			24.68			21.98		
Fussball (28)												
Kollektivmittelwert	1.8	75.48	20.15	133.11	202	74	71.61	140	29	96.64	127	59
Standardabweichung	0.05	6.11	0.78	35.41			22.07			16.34		
Eishockey (22)												
Kollektivmittelwert	1.82	81.46	20.32	120.32	155	58	80.09	204	37	93.82	185	42
Standardabweichung	0.04	5.42	0.65	29.93			34.02			29.1		

ventral: 152 s / >115 s
 lateral: 89 s / >57 s
 dorsal: 110 s / >89 s

Strength



**Isokinetic measurement
(Contrex)**

Physiological profile of Swiss elite alpine skiers – a 10-year longitudinal comparison

N. A. Maffiuletti¹, K. Jordan², H. Spring², F. M. Impellizzeri¹ and M. Bizzini¹

¹ *Neuromuscular Research Laboratory, Schulthess Clinic, Zurich, Switzerland*

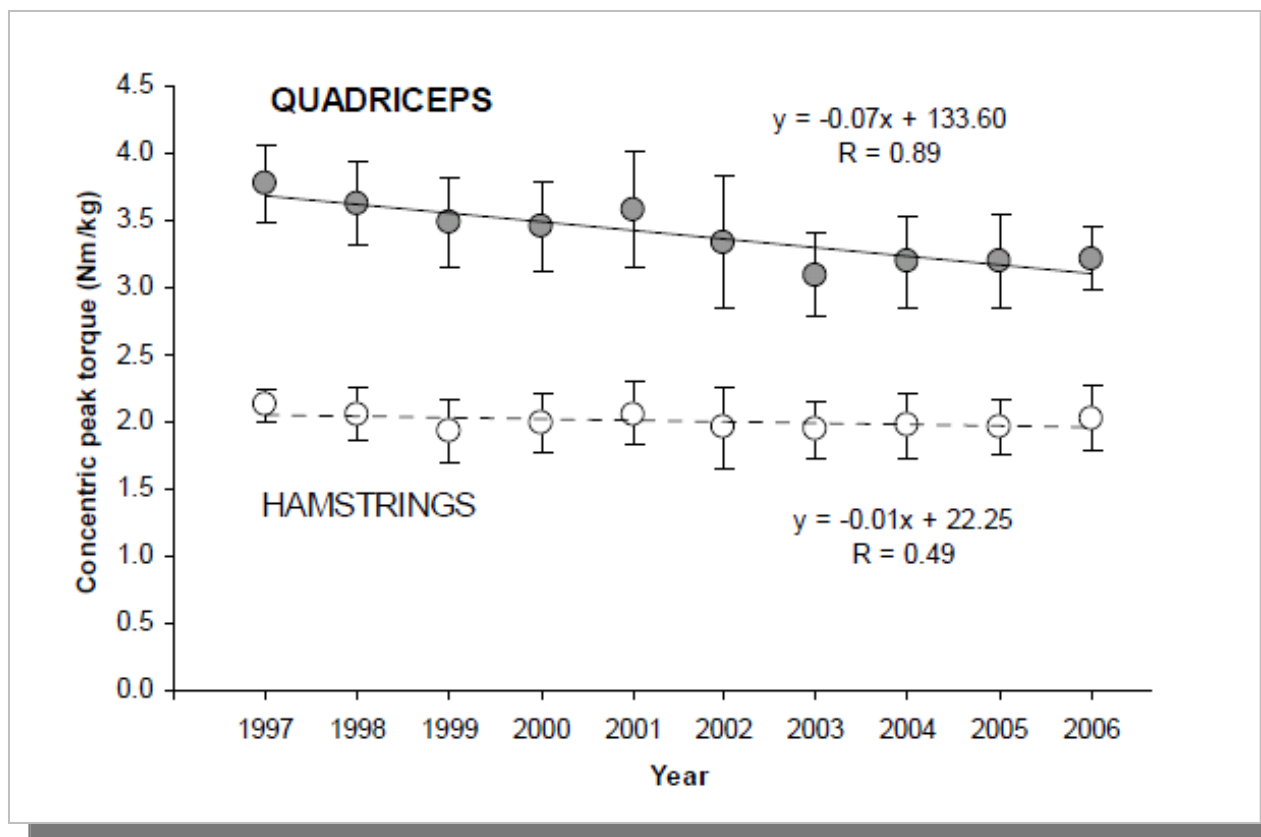
² *Rheuma- & Rehabilitationsklinik Leukerbad, Leukerbad, Switzerland*

SCIENCE AND SKIING IV

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2009 by Meyer & Meyer Sport (UK), Ltd.

ISBN 978-1-84126-255-0



Absolute concentric quadriceps (gray-filled circles) and hamstring (open circles) peak torque relative to body weight for the period 1997-2006. Mean values \pm SD.



Worldcup Downhill
 Kitzbühel 1/2009



D. Albrecht 5.09
= 3 1/2 months later



REHAZENTRUM
LEUKERBAD

CON TREX RUMPF - KRAFTAUSDAUER



Albrecht Daniel		Geb. Datum:	25.5.83	Vergleich zum Test vom	
		Test Datum:	6.5.09	Kader	Test Datum:
Sport :	Ski Alpin	Gewicht:	82	WC	Gewicht :
					19.4.06
					86.5

Extension - Rumpfstrecker

zu verbessern

Peak Torque % BW / Nm bei	60 °	264	453	-42%	<input type="text"/>
	Richtwert	460			
		-43%			
Kraftausdauer - Joules bei	120°	5439	10289	-47%	<input type="text"/>
	Richtwert	9600			
		-43%			

FLEXION - RUMPFBEUGER

Peak Torque % BW / Nm bei	60 °	223	304	-27%	<input type="text"/>
	Richtwert	305			
		-27%			
Kraftausdauer - Joules bei	120°	5730	7247	-21%	<input type="text"/>
	Richtwert	7000			
		-18%			

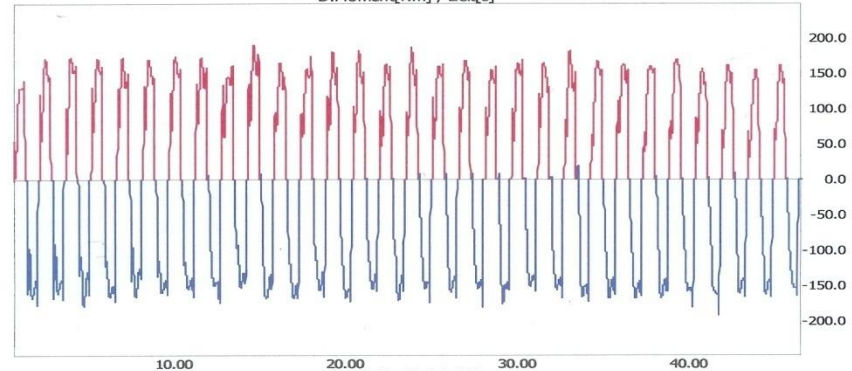
Verhältnis Beuger / Strecker Maximalkraft	84	67	<input type="text"/>
	Richtwert	65 - 70	
Verhältnis Beuger / Strecker Kraftausdauer	105	70	<input type="text"/>
	Richtwert	70 - 75	

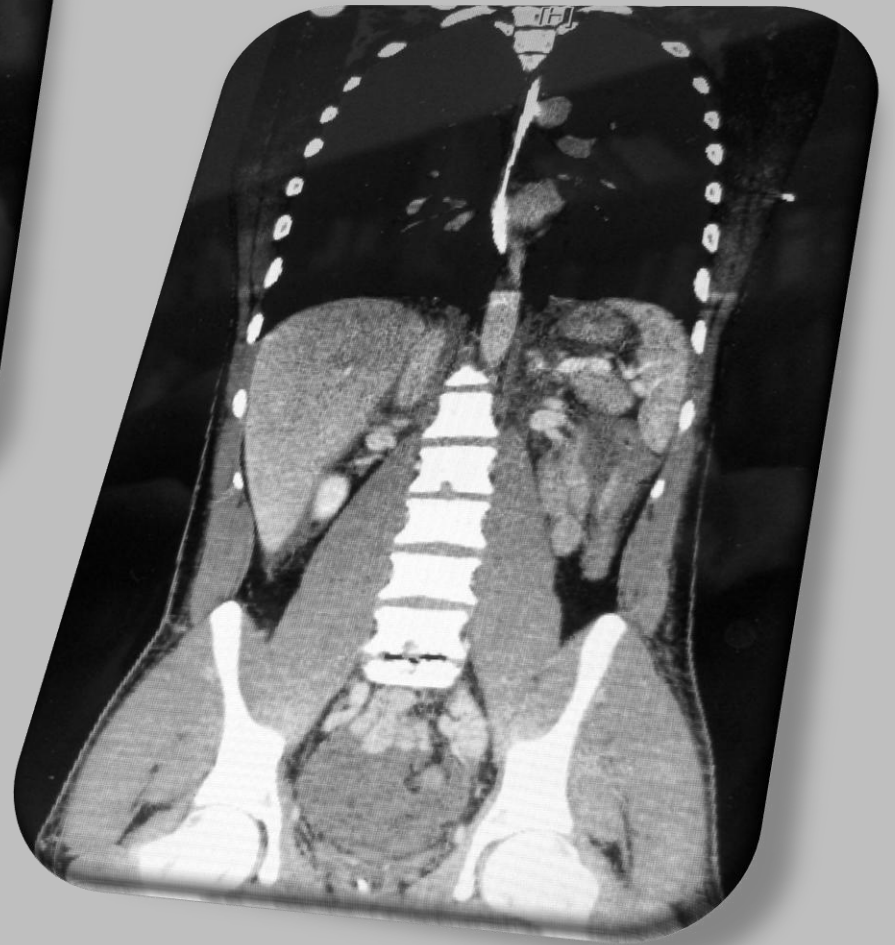
Testvoraussetzung: optimal nicht opti.

Testdurchführung: optimal nicht opti.

Testleiter Kurt Jordan Testbsp.Datum 6.5.09 *Duifproben*

D.Moment[Nm] / Zeit[s]



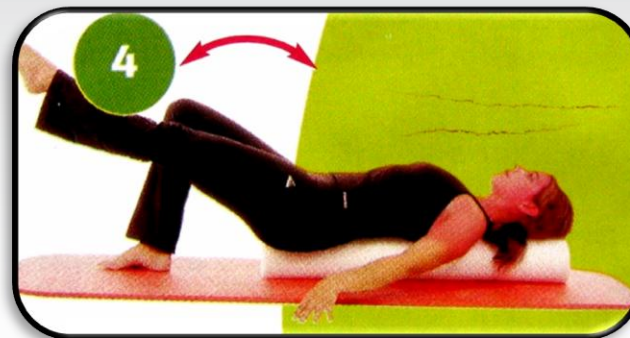
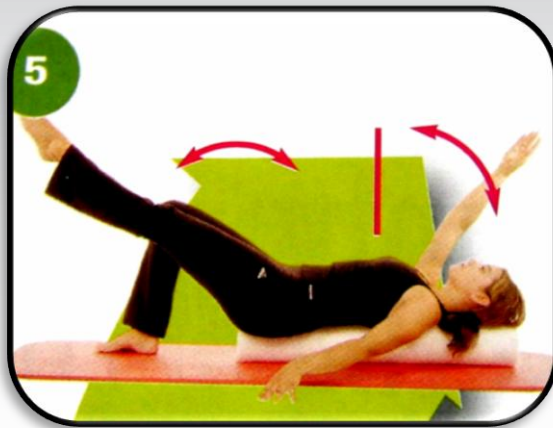
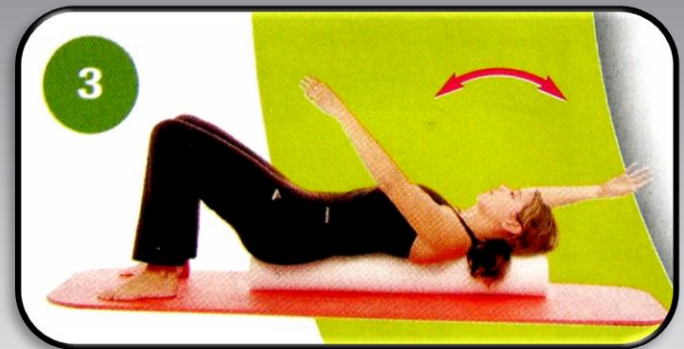
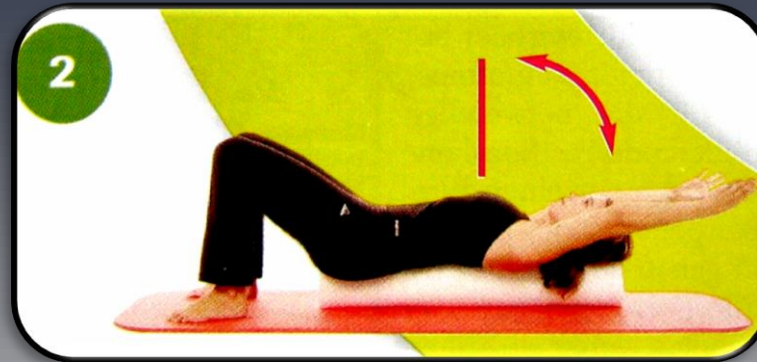
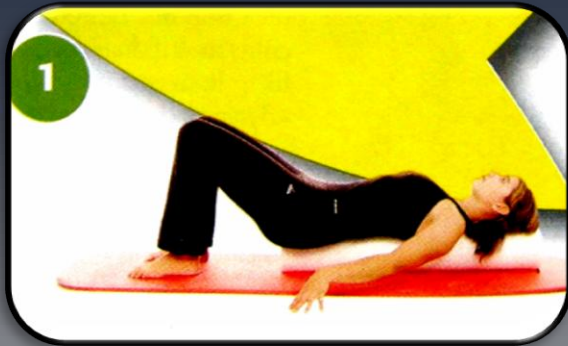


D. Albrecht 1.09



Training

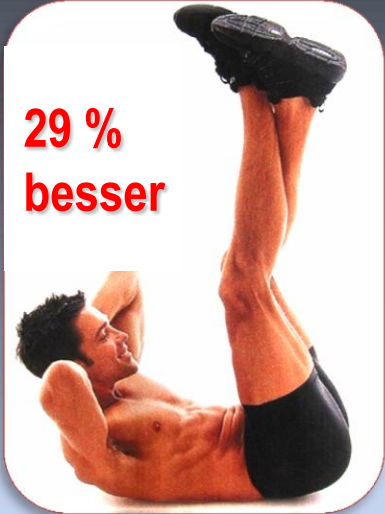
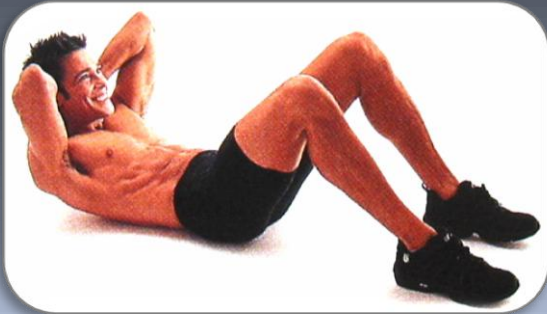
local muscles



The best Crunches

Men's Health 2/2002

(EMG Biomechanik San Diego State University)



the winner !



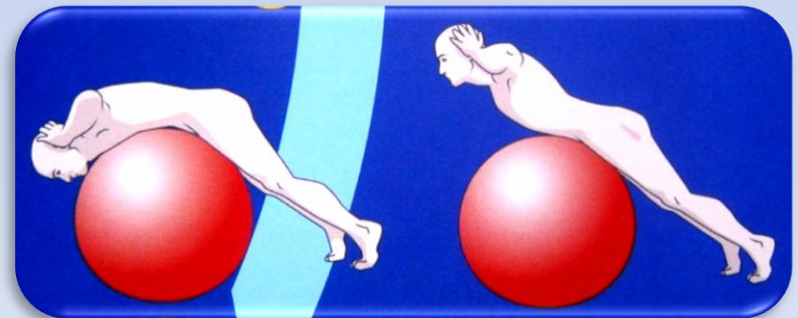
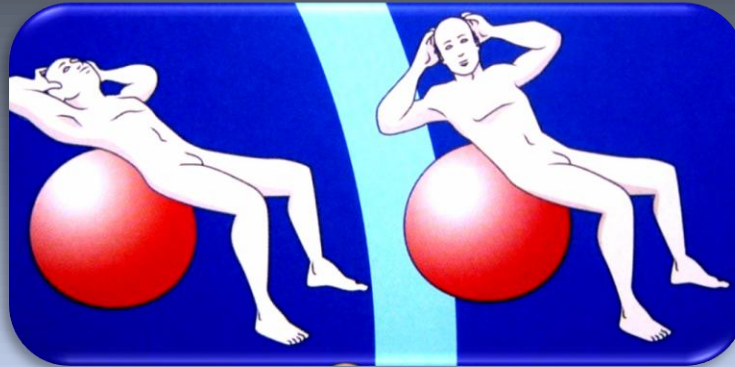
Strengthening program

concentric und eccentric



H. Spring, T. Tritschler: „Top 10“ für den Winter, DVD Suva

Coordination



H. Spring: Die 10 besten Übungen mit Gymnastikball, Theraband und Balancebrett.
GesundheitSprechstunde 9, 2007



Sling Training





RückenGYM

www.mepha.ch



mepha 

Die mit dem Regenbogen

«Top 10» für den Winter



DVD 359.d

suvaliv!

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