Webinair
14 settembre 2020

IL CORE TRAINING NELLO SPORT

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Dipartimento di Scienze Per la Qualità della Vita
Università di Bologna

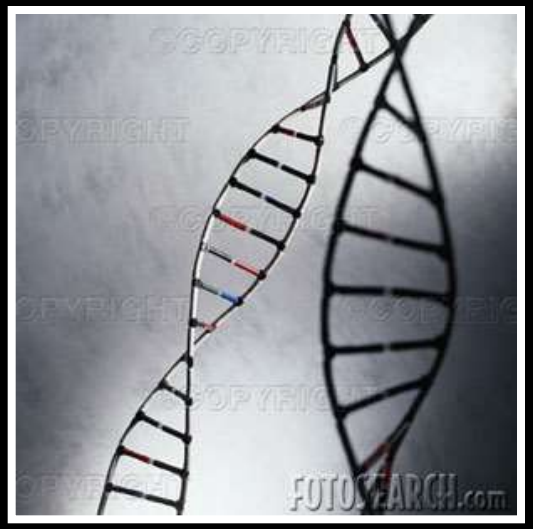
PROGRAMMA

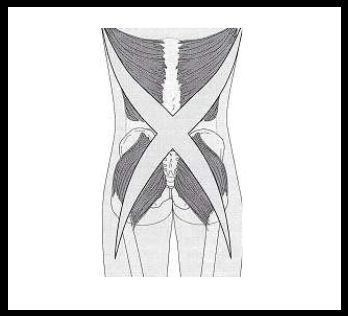
- Il concetto di core training: core stability, core strength e core endurance;
- Attualità scientifiche sul core ed evoluzione storica: dal core all'allenamento del movimento;
- Il ruolo del core training nello sport;
- La valutazione della Core attraverso i principali test presenti in letteratura;
- Proposte applicative.

Mission…

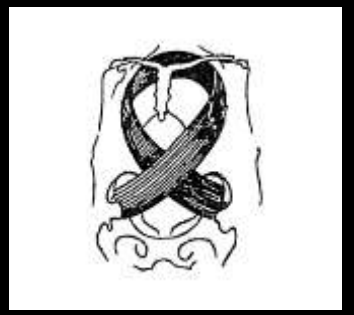
- CONOSCENZA TERMINOLOGIA CORRETTA RIGUARDANTE LE TIPOLOGIE DI CORE TRAINING
- VALUTARE CORRETTAMENTE LA REGIONE DEL CORE
- IL RUOLO DEL CORE TRAINING NEL MONDO SPORTIVO

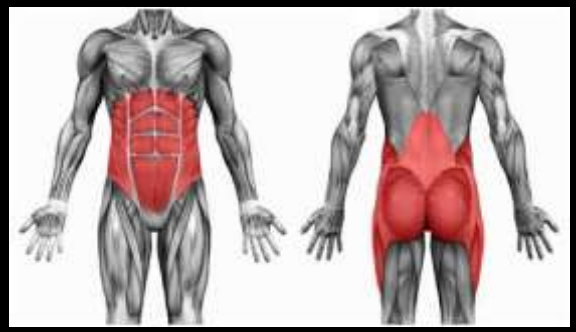
Dott.Belli Guido



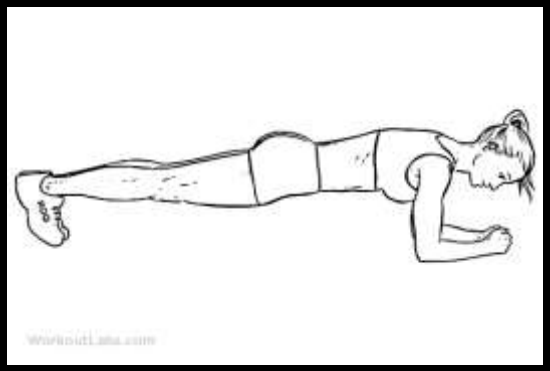


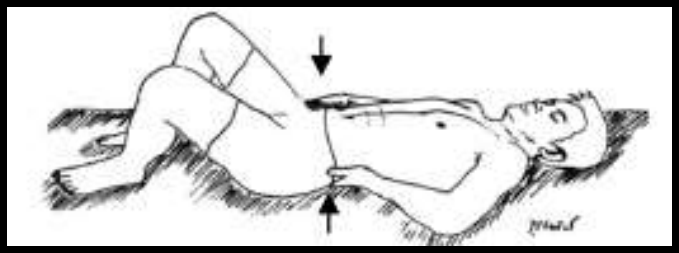
CORE



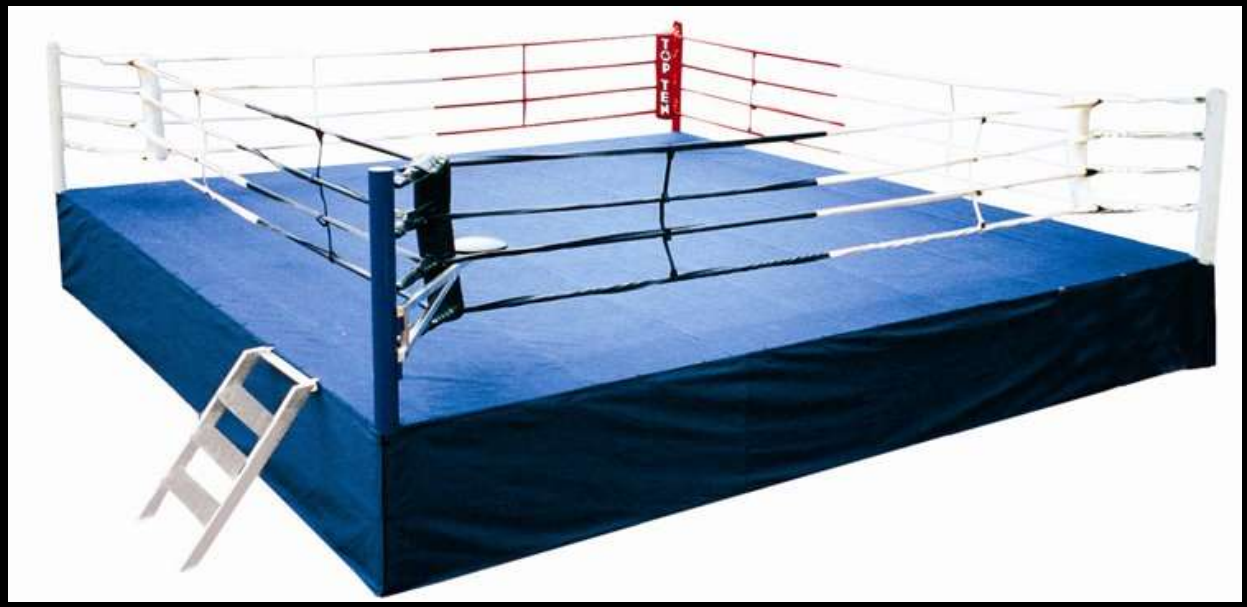


Dott.Belli Guido

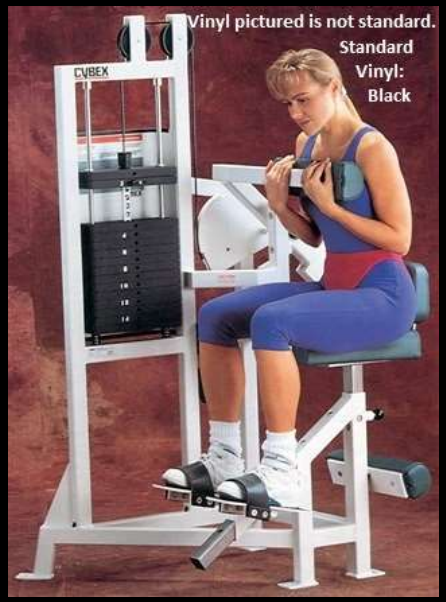




Dott.Belli Guido

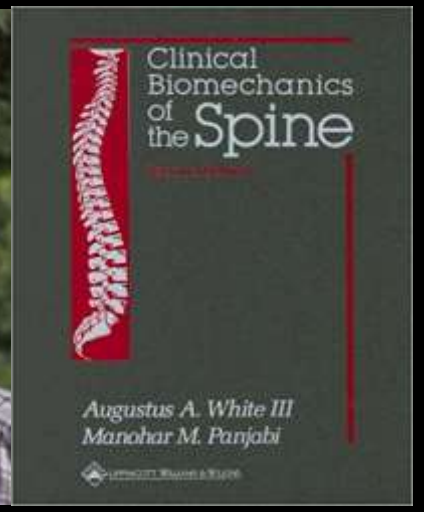


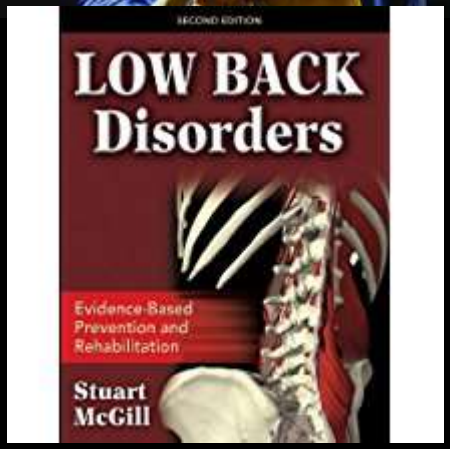
Dott.Belli Guido

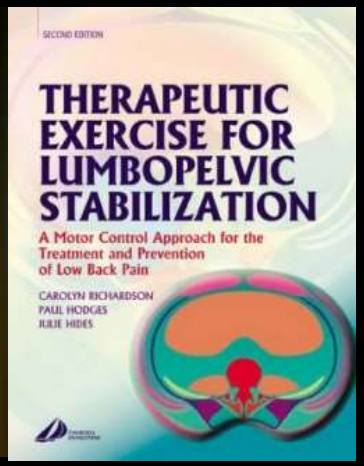


BACK TO THE 80s

Dott.Belli Guido

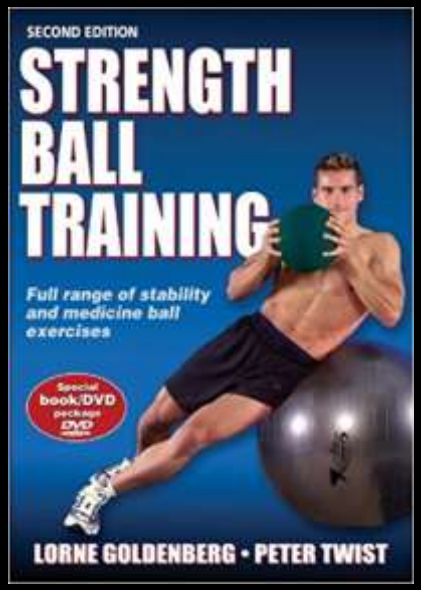






Dott.Belli Guido

WE ♥ 2000®



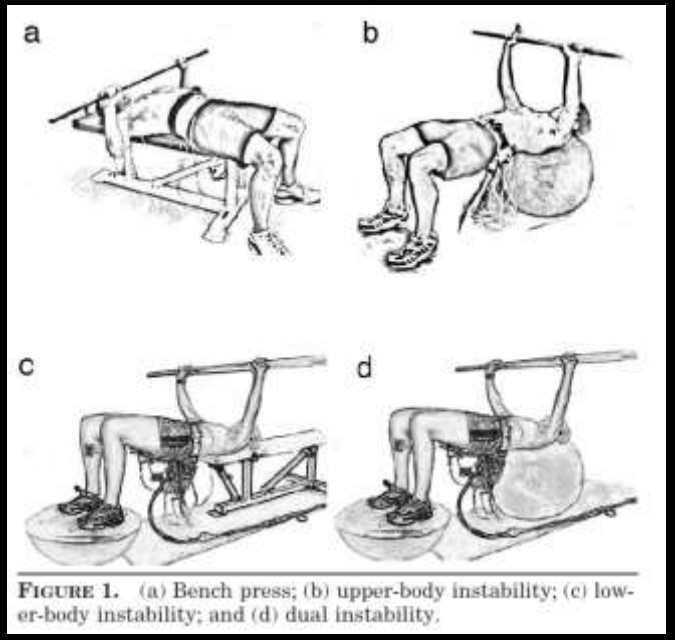


FIGURE 1. (a) Bench press; (b) upper-body instability; (c) lower-body instability; and (d) dual instability.

IJSPT

ORIGINAL RESEARCH

CORE MUSCLE ACTIVITY DURING THE CLEAN AND JERK LIFT WITH BARBELL VERSUS SANDBAGS AND WATER BAGS

Joaquin Calatayud, MSc, CSCS[1]
Juan C. Colado, PhD[1]
Fernando Martin, PhD[1]
José Casaña, MSc[2]
Markus D. Jakobsen, MSc[3,4]
Lars L. Andersen, PhD[1]

CORE MUSCLE ACTIVATION IN ONE-ARMED AND TWO-ARMED KETTLEBELL SWING

VIDAR ANDERSEN,[1] MARIUS S. FIMLAND,[2,3] ARIL GUNNARSKOG,[1] GEORG-ANDRÈ JUNGÅRD,[1] ROY-ANDRÈ SLÅTTLAND,[1] ØYVIND F. VRAALSEN,[1] AND ATLE H. SAETERBAKKEN[1]

Contents lists available at ScienceDirect

Journal of Science and Medicine in Sport

journal homepage: www.elsevier.com/locate/jsams

Original research

Core muscle activity during suspension exercises

Nicola W. Mok *, Ella W. Yeung, Jeran C. Cho, Samson C. Hui, Kimee C. Liu, Coleman H. Pang

IJSPT

SYSTEMATIC REVIEW

THE IMPACT OF LUMBOPELVIC CONTROL ON OVERHEAD PERFORMANCE AND SHOULDER INJURY IN OVERHEAD ATHLETES: A SYSTEMATIC REVIEW

Thane Cope[1]
Sarah Wechter[1]
Michaella Stucky[1]
Corey Thomas[1]
Mark Wilhelm[1]

The International Journal of Sports Physical Therapy | Volume 14, Number 4 | August 2019 | Page 500
DOI: 10.26603/ijspt20190500

Sports Med
DOI 10.1007/s40279-015-0426-4

CrossMark

SYSTEMATIC REVIEW

The Role of Trunk Muscle Strength for Physical Fitness and Athletic Performance in Trained Individuals: A Systematic Review and Meta-Analysis

Olaf Prieske[1] · Thomas Muehlbauer[1] · Urs Granacher[1]

Dott.Belli Guido

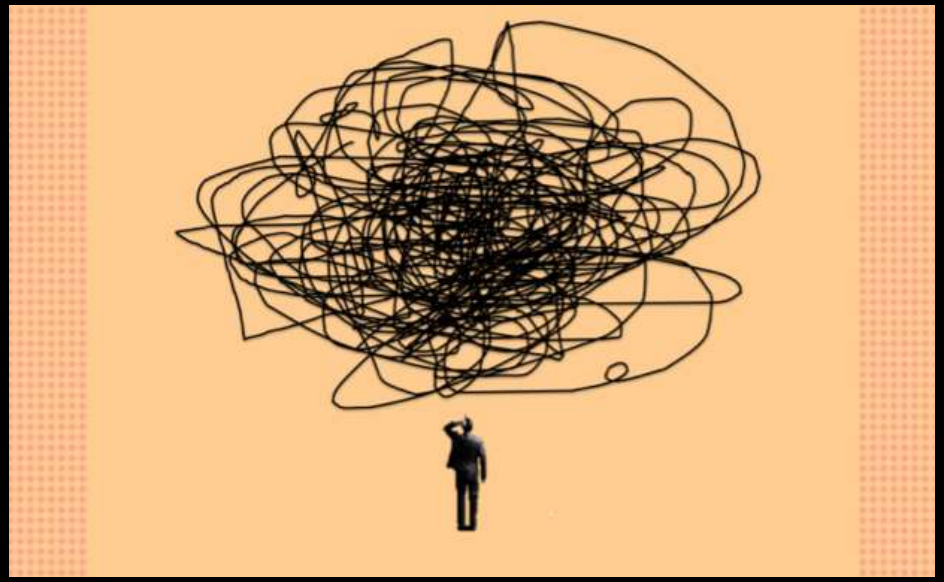
Dott.Belli Guido

CST

CORE
STABILITY
TRAINING

TMS

TRUNK
MUSCLE
STRENGTH



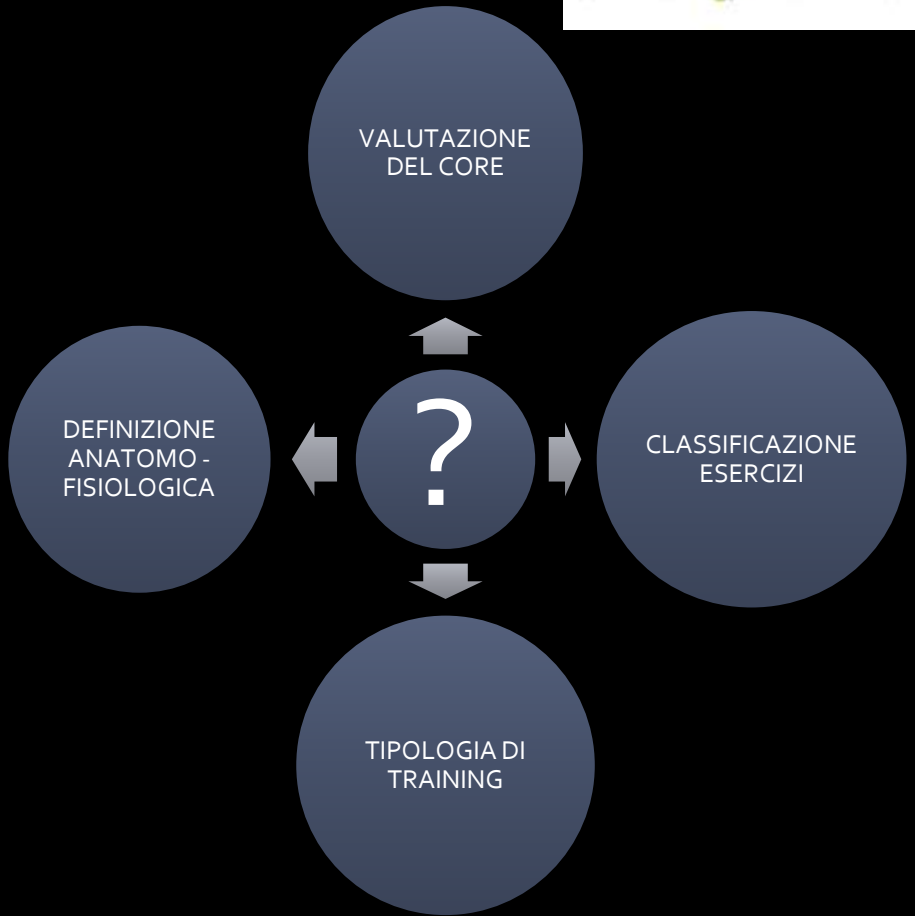
Clark et al. Sports Medicine - Open (2018) 4:32
https://doi.org/10.1186/s40798-018-0150-3

Sports Medicine - Open

ORIGINAL RESEARCH ARTICLE Open Access

Contemporary perspectives of core stability training for dynamic athletic performance: a survey of athletes, coaches, sports science and sports medicine practitioners

David R. Clark[1*], Michael I. Lambert[2] and Angus M. Hunter[3]



- Questionario su tematiche riguardanti il core
- 241 interviste tra allenatori, preparatori, medici, fisioterapisti ed atleti di varie discipline sportive
- Alto livello di preparazione tecnica ed accademica
- Anni di esperienza media nel contesto sportivo di riferimento: 8

Dott.Belli Guido

Journal of Bodywork & Movement Therapies (2010) 14, 84–98

available at www.sciencedirect.com

ScienceDirect

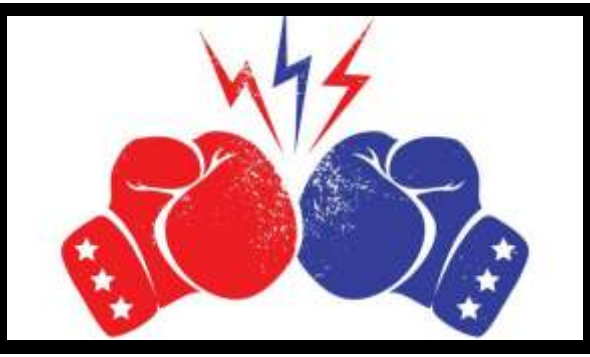
journal homepage: www.elsevier.com/jbmt

Journal of Bodywork and Movement Therapies

CRITICAL REVIEW

The myth of core stability

Eyal Lederman*



Core Stability: The Centerpiece of Any Training Program

Lisa S. Bliss, MD and Peter Teeple, MSPT, OCS*

Current Sports Medicine Reports 2005, 4:179–183
Current Science Inc. ISSN 1537-890x

EVIDENCE BASED

NON EVIDENCE BASED

PubMed

National Library of Medicine NLM

The Cochrane Library
Evidence for healthcare decision-making

Journal of Strength and Conditioning Research, 2007, 21(3), 979–985

Brief Review

CORE STABILITY TRAINING: APPLICATIONS TO SPORTS CONDITIONING PROGRAMS

JEFFREY M. WILLARDSON

Physical Education Department, Eastern Illinois University, Charleston, Illinois 61920

REVIEW ARTICLE

Sports Med 2008; 38 (12): 995-1008
0112-1642/08/0012-0995/$48.00/0

Optimizing Performance by Improving Core Stability and Core Strength

Angela E. Hibbs,[1,3] *Kevin G. Thompson,*[1,4] *Duncan French,*[1] *Allan Wrigley*[2] and *Iain Spears*[3]

1 English Institute of Sport, Gateshead, UK
2 Canadian Sport Centre Pacific, Vancouver, British Columbia, Canada
3 University of Teesside, Middlesbrough, UK
4 School of Psychology and Sports Science, Northumbria University, Newcastle, UK

REVIEW ARTICLE

Sports Med 2008; 38 (11): 893-916
0112-1642/08/0011-0893/$48.00/0

The Importance of Sensory-Motor Control in Providing Core Stability

Implications for Measurement and Training

Jan Borghuis,[1] *At L. Hof*[1] and *Koen A.P.M. Lemmink*[1,2]

SYSTEMATIC REVIEW

Sports Med 2012; 42 (8): 697-706
0112-1642/12/0008-0697/$49.95/0

The Effects of Isolated and Integrated 'Core Stability' Training on Athletic Performance Measures

A Systematic Review

Casey A. Reed,[1,2] *Kevin R. Ford,*[1,3,4] *Gregory D. Myer*[1,3,5,6,7] and *Timothy E. Hewett*[1,2,3,8]

BRIEF REVIEW

27(6)/1684–1698
Journal of Strength and Conditioning Research

Systematic Review of Core Muscle Activity During Physical Fitness Exercises

Jason M. Martuscello,[1] James L. Nuzzo,[2] Candi D. Ashley,[1] Bill I. Campbell,[1] John J. Orriola,[3] and John M. Mayer[2]

Sports Med (2017) 47:401–414
DOI 10.1007/s40279-016-0597-7

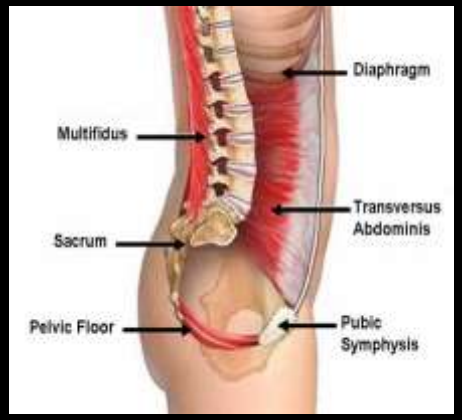
REVIEW ARTICLE

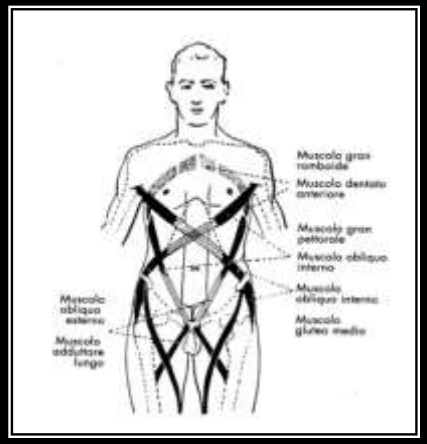
Core Stability in Athletes: A Critical Analysis of Current Guidelines

Klaus Wirth[1] · Hagen Hartmann[2] · Christoph Mickel[2] · Elena Szilvas[2] · Michael Keiner[3] · Andre Sander[4]

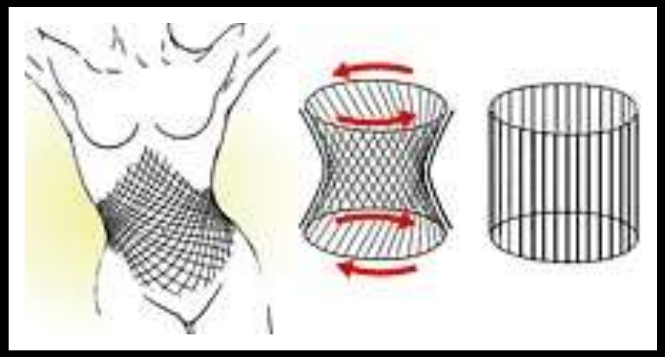
CORE

- "...box cilindrico composto dai muscoli addominali anteriormente, glutei e paraspinali posteriormente, diaframma come parte superiore e pavimento pelvico/articolazione dell'anca come base inferiore..." (Richardson 1999)
- "...il complesso lombo-pelvico formato da colonna vertebrale lombare, bacino, articolazione dell'anca e da tutti i muscoli che producono o limitano i movimenti di questi segmenti..." (Willson 2005)
- "...l'insieme di tutte le componenti anatomiche tra sterno e ginocchia con focus su regione addominale, low back e anche..." (Fig 2005)





Core: Definizioni



"corsetto muscolare che lavora come un unità per stabilizzare il corpo e la colonna vertebrale in presenza o assenza di movimenti degli arti, fungendo da "centro" delle catene cinetiche funzionali (la traduzione letteraria di "core" è infatti "centro") e consentendo il collegamento reciproco tra tratto assile e tratti appendicolari"

(Akuthota 2004)

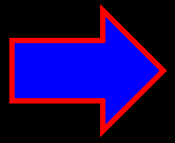
Core: Definizioni

"…agisce come una base anatomica per il movimento dei segmenti corporei garantendo la stabilità prossimale per assicurare la mobilità distale (Kibler 2006) ***e proteggendo il rachide e le strutture nervose durante carichi di lavoro"*** (Willardson 2007)

RUOLO 'CORE CENTRICO'

L'attività muscolare del CORE va intesa come un'INTEGRAZIONE PRE-PROGRAMMATA tra MUSCOLI LOCALI (mono-articolari) e MUSCOLI GLOBALI (multi-articolari), con l'OBIETTIVO di PROVVEDERE alla STABILITA' e PRODURRE MOVIMENTO

STABILITA'
Evento Centrale

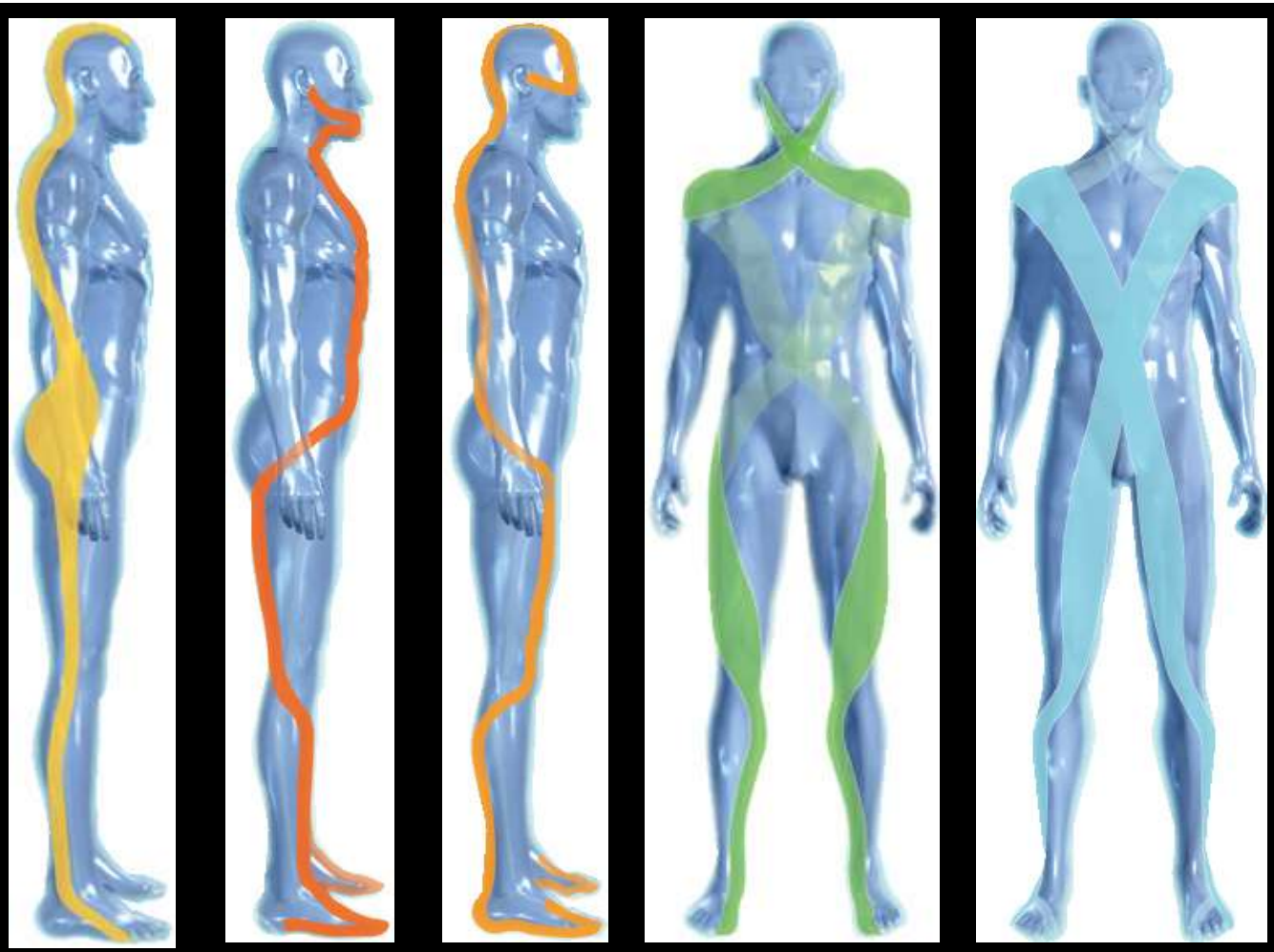


MOBILITA'
Evento Periferico

Il RISULTATO FINALE è un'ATTIVAZIONE PROSSIMO-DISTALE che, grazie a momenti interattivi sincroni, MUOVE E PROTEGGE LE ARTICOLAZIONI DISTALI

(Kibler, 2006; Andorlini, 2013)

Core: Aspetti Fisiologici



(L.Busquet 1992)

Core: visione globale

CORE → PILLAR

Oltre al CORE, il PILLAR comprende altre due UNITA' FUNZIONALI:

CINTURA SCAPOLARE

COMPLESSO COXO-FEMORALE

HICS Complex

HIP-CORE-SCAPULA

(Andorlini, 2013)

Da CORE a PILLAR - HICS…

Ogni **Movimento è CORE-DIPENDENTE** ed ha quindi un'alta CORRELAZIONE con il **CORRETTO FUNZIONAMENTO DEL NUCLEO STABILIZZATORE CENTRALE** e delle **PIATTAFORME di STABILITA' PERIFERICHE** (Complesso Coxo-Femorale e Scapolo-Omerale)

Ogni MOVIMENTO prodotto dalla CATENA CINETICA trova la propria ORIGINE MOTORIA nei MOVIMENTI FONDAMENTALI…

(Andorlini, 2013)

Core: Aspetti Fisiologici

- Il CORE rappresenta una UNITA' FUNZIONALE INTEGRATA
- Le catene cinetiche del corpo operano sinergicamente per produrre forze, ridurre forze e stabilizzare dinamicamente in risposta a forze anormali
- In uno stato di efficienza ottimale il CORE consente di:
  - Distribuire armonicamente i carichi corporei prossimali e distali
  - Assorbire le forze agenti nel complesso lombo-pelvico
  - Trasferire le forze tra tratto assile e tratti appendicolari

Dott.Belli Guido

Core training e allenamento funzionale

CORE TRAINING

GRAVITY TRAINING

MOVEMENT TRAINING

Andorlini 2011

Movement Training…

FUNZIONAMENTO	Tende verso	FUNZIONALITA’
STRESS FISIOLOGICO	Tende verso	IMPUT NEUROLOGICO
ADATTAMENTO	Tende verso	ADATTABILITA’
SELEZIONE	Tende verso	INTEGRAZIONE
ATTIVAZIONE ANALITICA	Tende verso	AZIONE COMPLESSA

Andorlini 2011

Movement Training…

ESERCIZIO	Tende verso →	MOVIMENTO
MOVIMENTO	Tende verso →	GESTO
CAPACITA' CONDIZIONALE	Tende verso →	ABILITA' MOTORIA

INTEGRAZIONE

Allenamento 'TRADIZIONALE'

MOVEMENT TRAINING

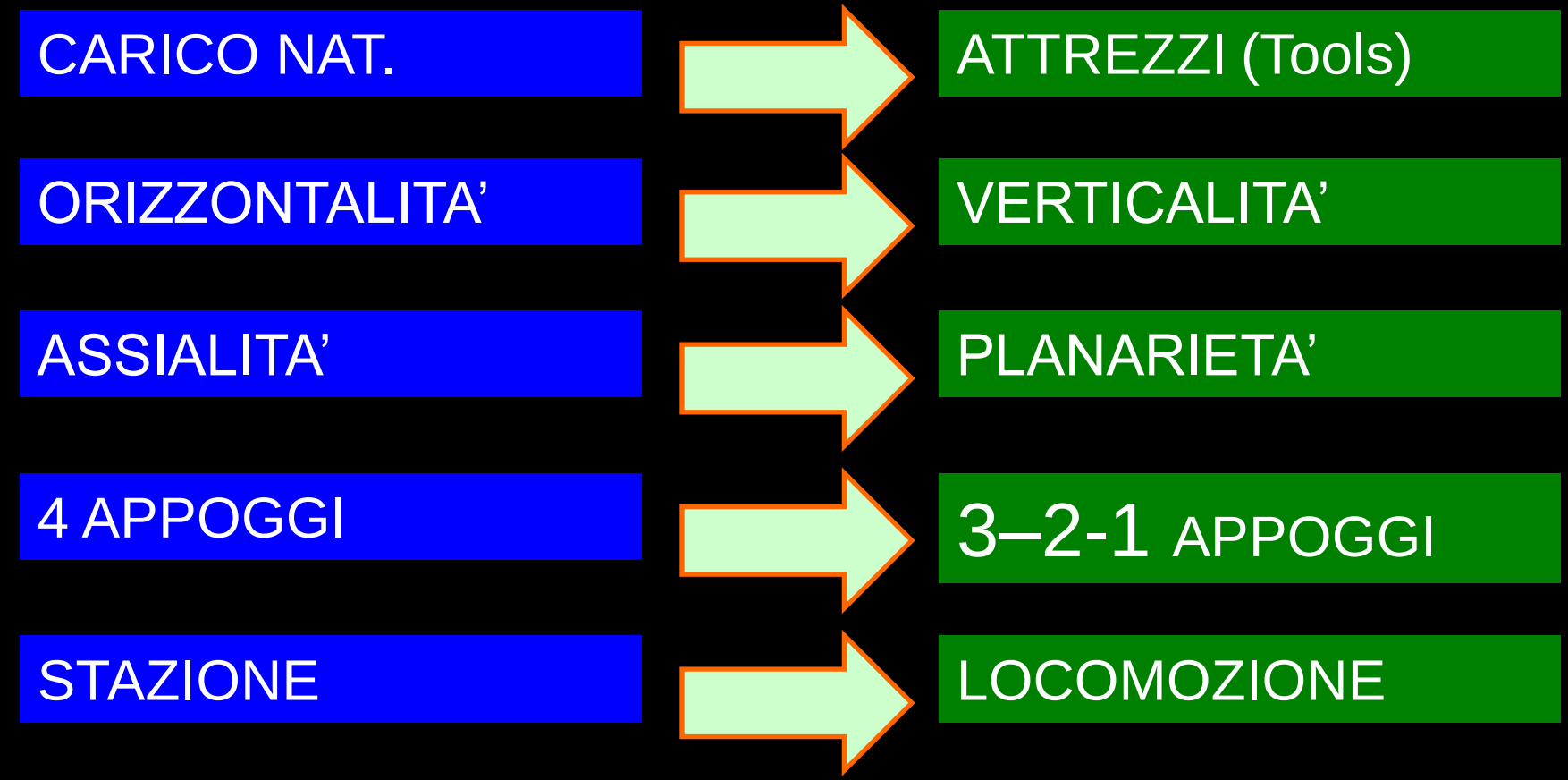
Andorlini 2011

Core training e allenamento funzionale

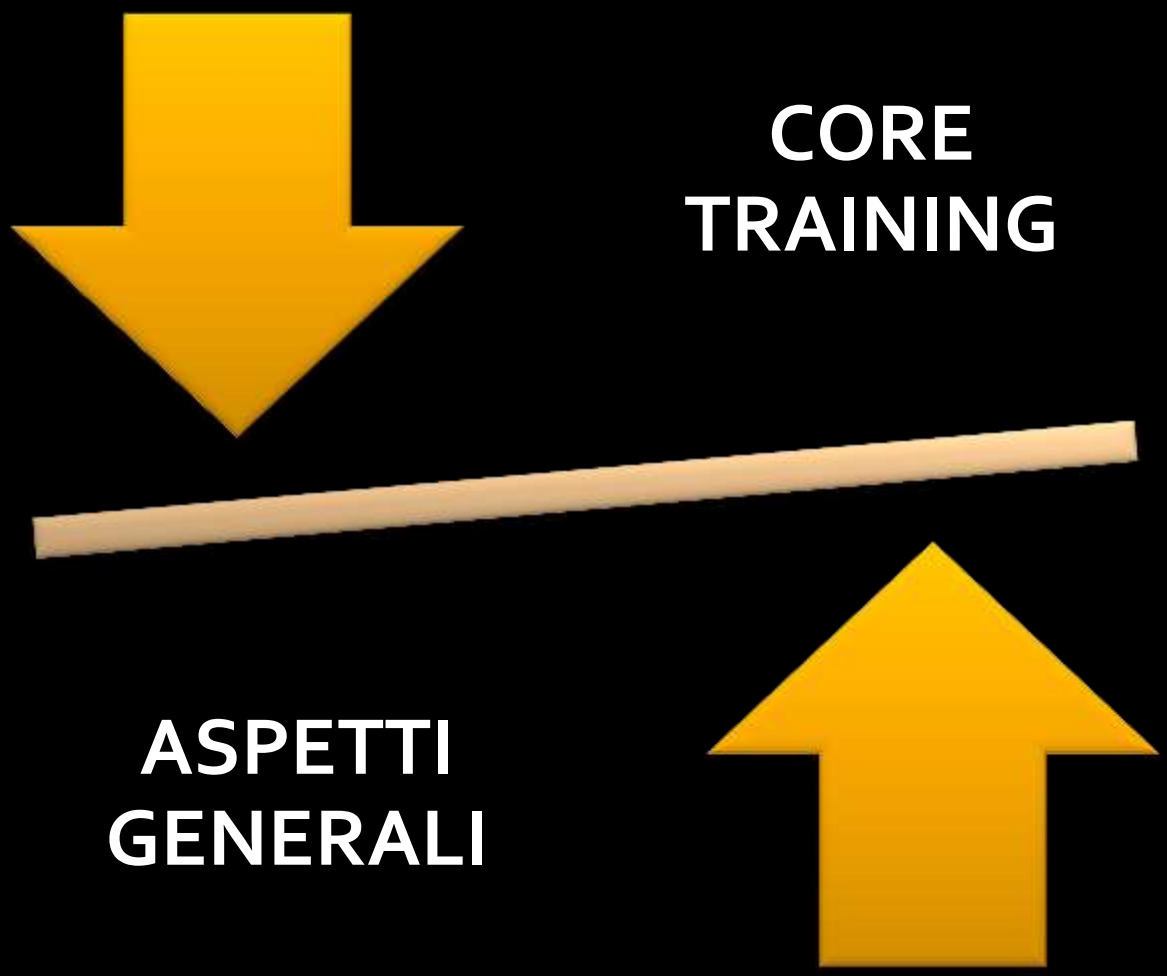
Lo SPORT può essere inteso come la FINALIZZAZIONE di una FUNZIONE SPORT-SPECIFICA

Le CONNESSIONI tra MOVIMENTI FONDAMENTALI SINGOLI generano schemi di movimento la cui peculiarità risiede nello SVILUPPO TRIDIMENSIONALE (*skills*) e la cui FINALIZZAZIONE porta all'espletamento della FUNZIONE propria del MOVIMENTO

Movement training progression



(Andorlini, 2013)


CORE
TRAINING
ASPETTI
GENERALI

Dott.Belli Guido

Core: Aspetti Generali

CORE STABILITY: settore rieducativo - preventivo

CORE STRENGHT: settore sportivo – performance

Journal of Novel Physiotherapy and Physical Rehabilitation

Peertechz

Atle Hole Saeterbakken[1]*, Marius Steiro Fimland[2,3], Jonas Navarsete[1], Trine Kroken[1] and Roland van den Tillaar[4]

[1]Sogn og Fjordane University College, Norway
[2]Department of Public Health and General Practice, Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway
[3]Hysnes Rehabilitation Center, St. Olavs University Hospital, Trondheim, Norway
[4]Department of Teacher Education of Nord Trondelag University College, Levanger, Norway

Research Article

Muscle Activity, and the Association between Core Strength, Core Endurance and Core Stability

06 May, 2015;

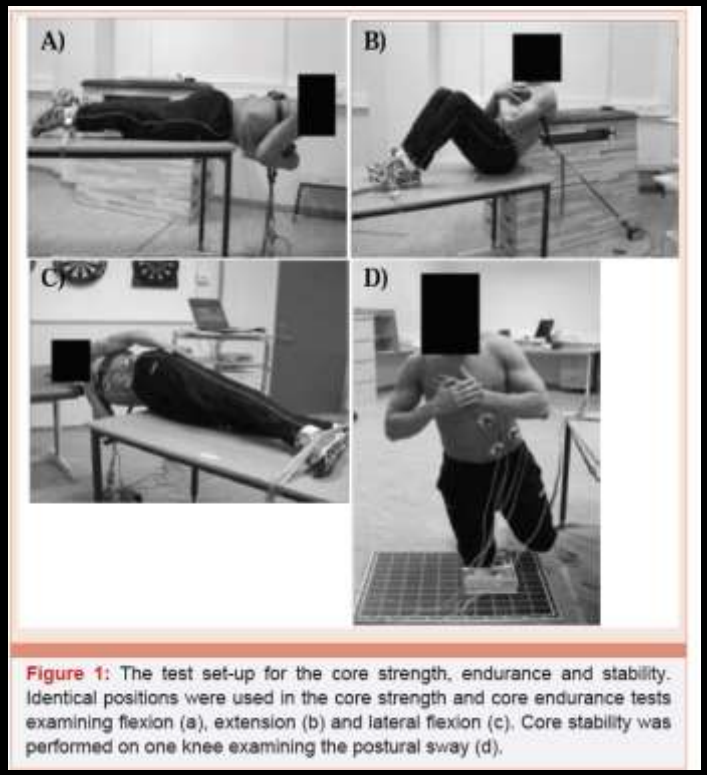


Figure 1: The test set-up for the core strength, endurance and stability. Identical positions were used in the core strength and core endurance tests examining flexion (a), extension (b) and lateral flexion (c). Core stability was performed on one knee examining the postural sway (d).

Conclusion

There were no systematic correlations between core endurance, core strength and core stability indicating that these capacities are largely independent from each other. Furthermore, muscle activity executing the flexion and lateral flexion endurance tests surpassed the threshold suggested to increase strength. Coaches, training instructors or physical therapists needs to address the core endurance, core strength and core stability as separate capacities and train them accordingly based on the aim of the training. If high intensity exercises are contra-indicated, core endurance exercises should also increase strength if they are performed (close) to muscular fatigue, but this is not the case with stability exercises.

Core: Aspetti Generali

CORE STABILITY: capacità della muscolatura del "core" di mantenere una adeguata stabilità funzionale intorno al rachide lombare *(Akuthota 2004)*

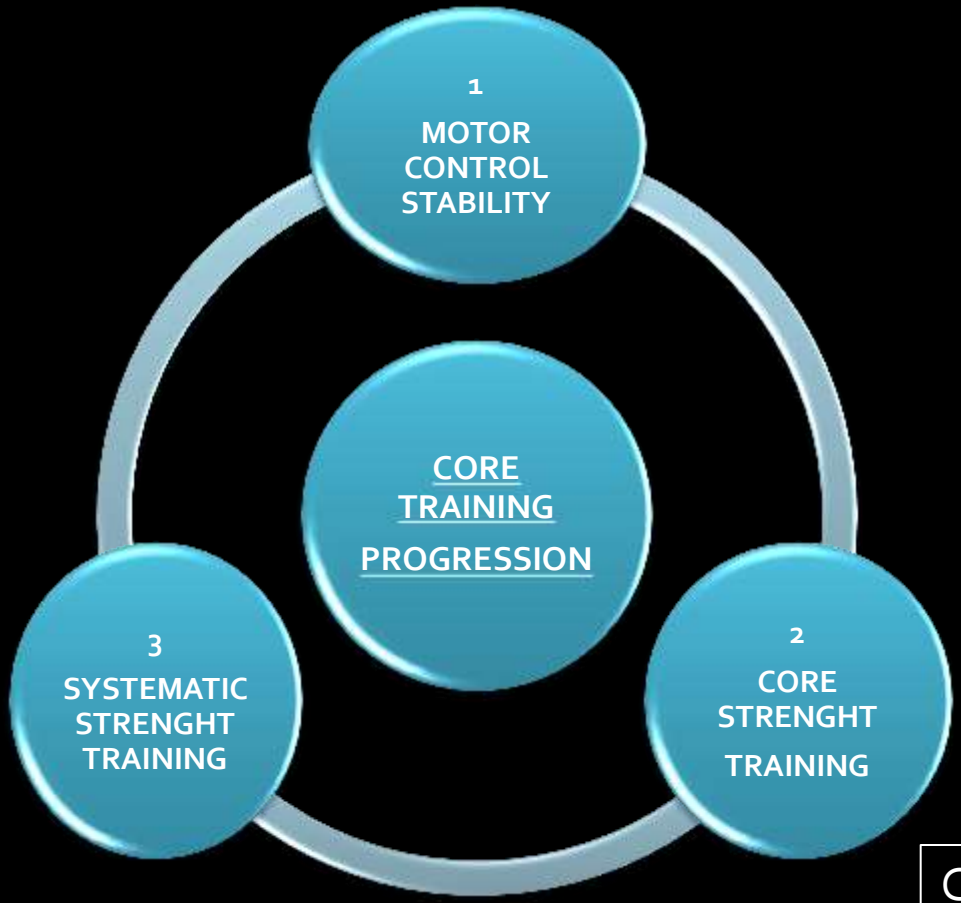
CORE STRENGHT: capacità della muscolatura di produrre potenza attraverso la forza contrattile e la pressione intra-addominale" *(Faries e Grenwood 2007)*

Hibbs 2008

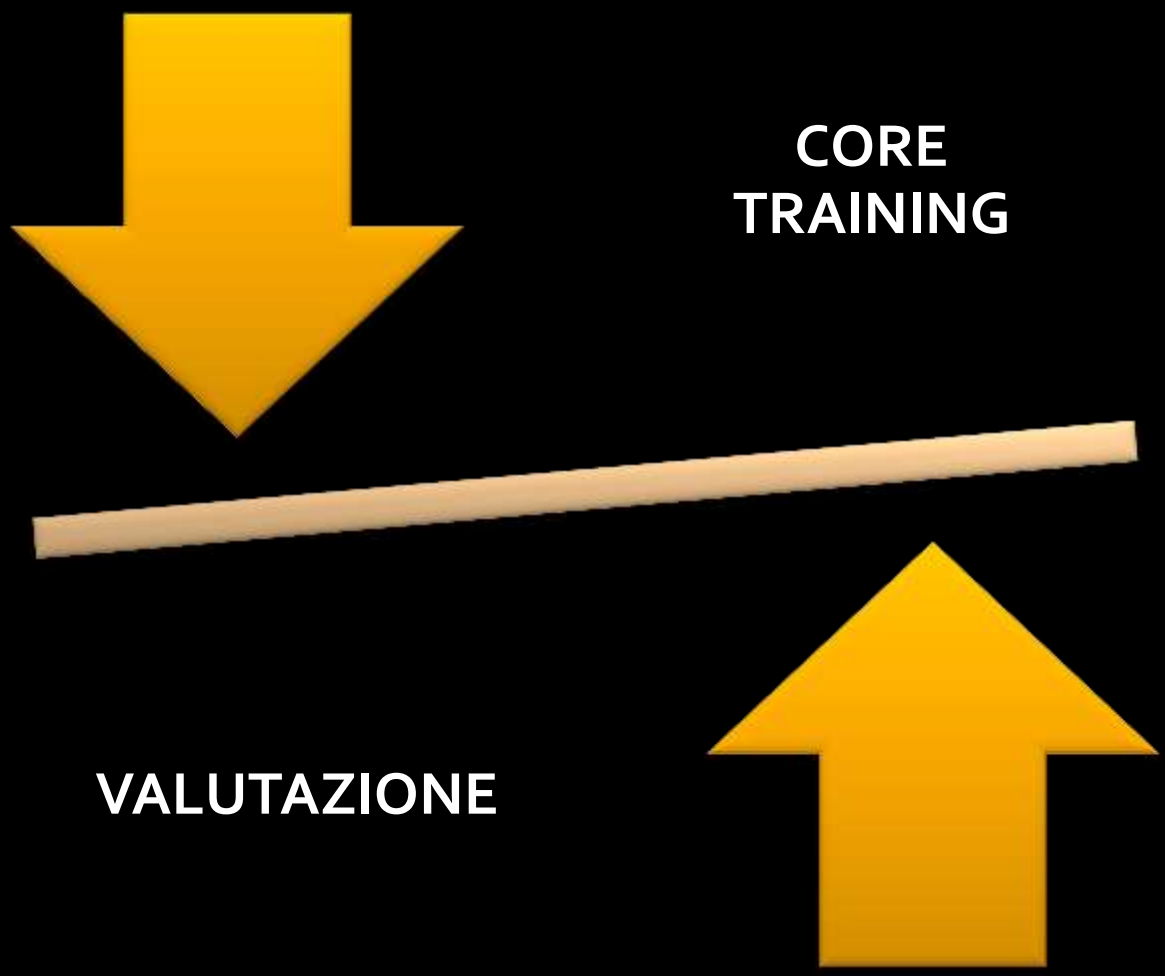
"l'abilità di controllare la posizione e il movimento del tronco sopra il bacino per permettere un ottimale produzione, trasferimento e controllo di forze e movimento ai segmenti distali in attività atletiche integrate" (Kibler 2006)

Dott.Belli Guido

Core: Aspetti Generali



Comerford 2007


CORE
TRAINING
VALUTAZIONE

Total core score static and dynamic (Bisciotti 2014): valutazione della asimmetria tra emilato destro e sinistro del corpo durante esercizi di core training statici e dinamici attraverso una misurazione di parametri spazio (metri) –temporali (secondi)

STATICO	Dx in app	Sx in app	diff %	(maggiore - minore / maggiore)x 100
BRIDGE PRONO				
BRIDGE SUPINO				
BRIDGE LAT (ABD)				
BRIDGE LAT (ADD)				
CORE TOTAL SCORE STATICO	0	0		
DINAMICO	Dx in app	Sx in app	diff %	(maggiore - minore / maggiore)x 100
LANCIO CON TWIST				
LANCIO IN EXT				
LANCIO IN FLEX				
CORE TOTAL SCORE DINAMICO	0	0		

Elbow Plank: (Tong 2014): valutazione dell'endurance del core attraverso il mantenimento isometrico del Plank con movimenti alterni degli arti

throughout the following stages with no rest in between: (1) hold the basic plank position for 60 s; (2) lift the right arm off the ground and hold for 15 s; (3) return the right arm to the ground and lift the left arm for 15 s; (4) return the left arm to the ground and lift the right leg for 15 s; (5) return the right leg to the ground and lift the left leg for 15 s; (6) lift both the left leg and right arm from the ground and hold for 15 s; (7) return the left leg and right arm to the ground, and lift both the right leg and left arm off the ground for 15 s; (8) return to the basic plank position for 30 s; (9) repeat the steps from (1) to (9) until the maintenance of the prone bridge failed.

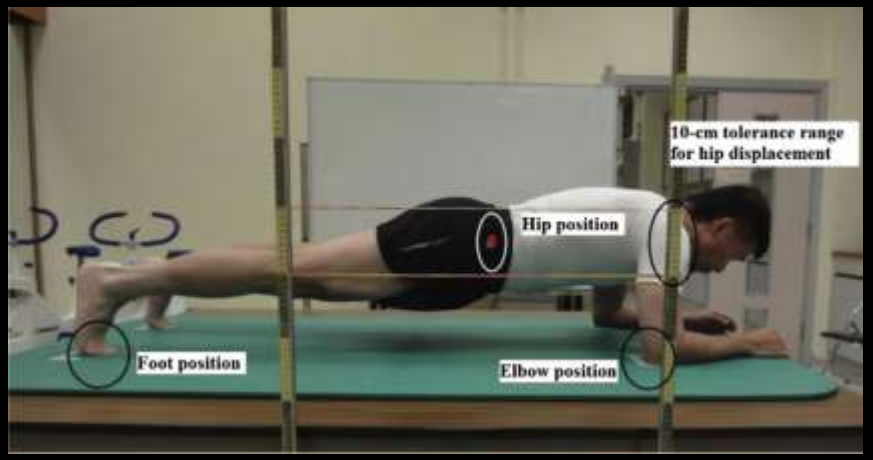
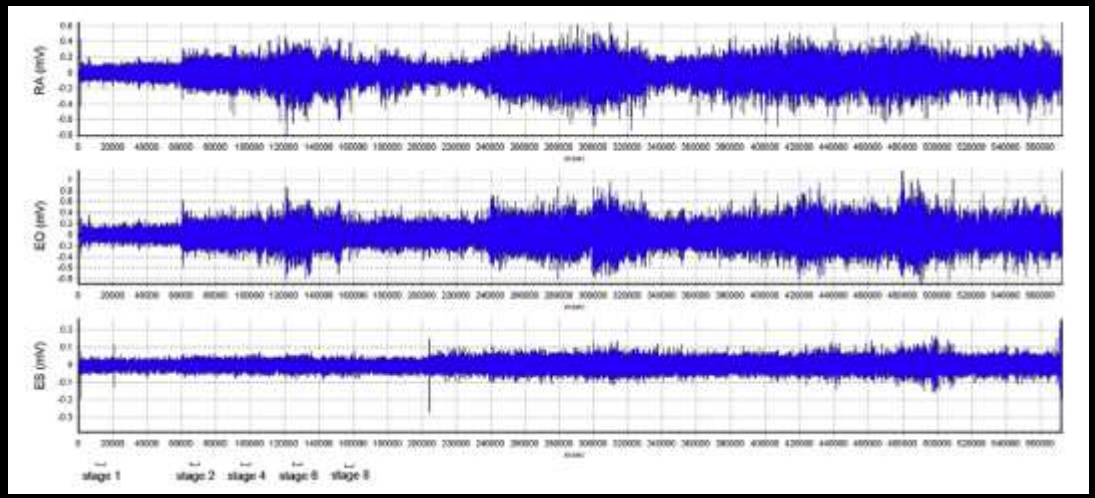


Table 1
Percentage of maximum voluntary isometric contraction (%MVIC) in the rectus abdominis (RA), external oblique (EO) and erector spinae (ES) at stages 1, 2, 4, 6 and 8 of the sport-specific endurance plank test ($n = 8$).

	%MVIC (%)				
	Stage 1	Stage 2	Stage 4	Stage 6	Stage 8
RA	32.7 ± 10.8	47.7 ± 13.5*	50.0 ± 17.9*	73.7 ± 22.3*ab	63.2 ± 8.2*a
EO	31.7 ± 8.5	42.8 ± 11.9	56.6 ± 17.7*	68.6 ± 14.1*a	55.2 ± 7.4*ac
ES	3.3 ± 1.2	4.7 ± 1.3*	4.6 ± 2.9	6.3 ± 2.1*ab	5.1 ± 2.2*

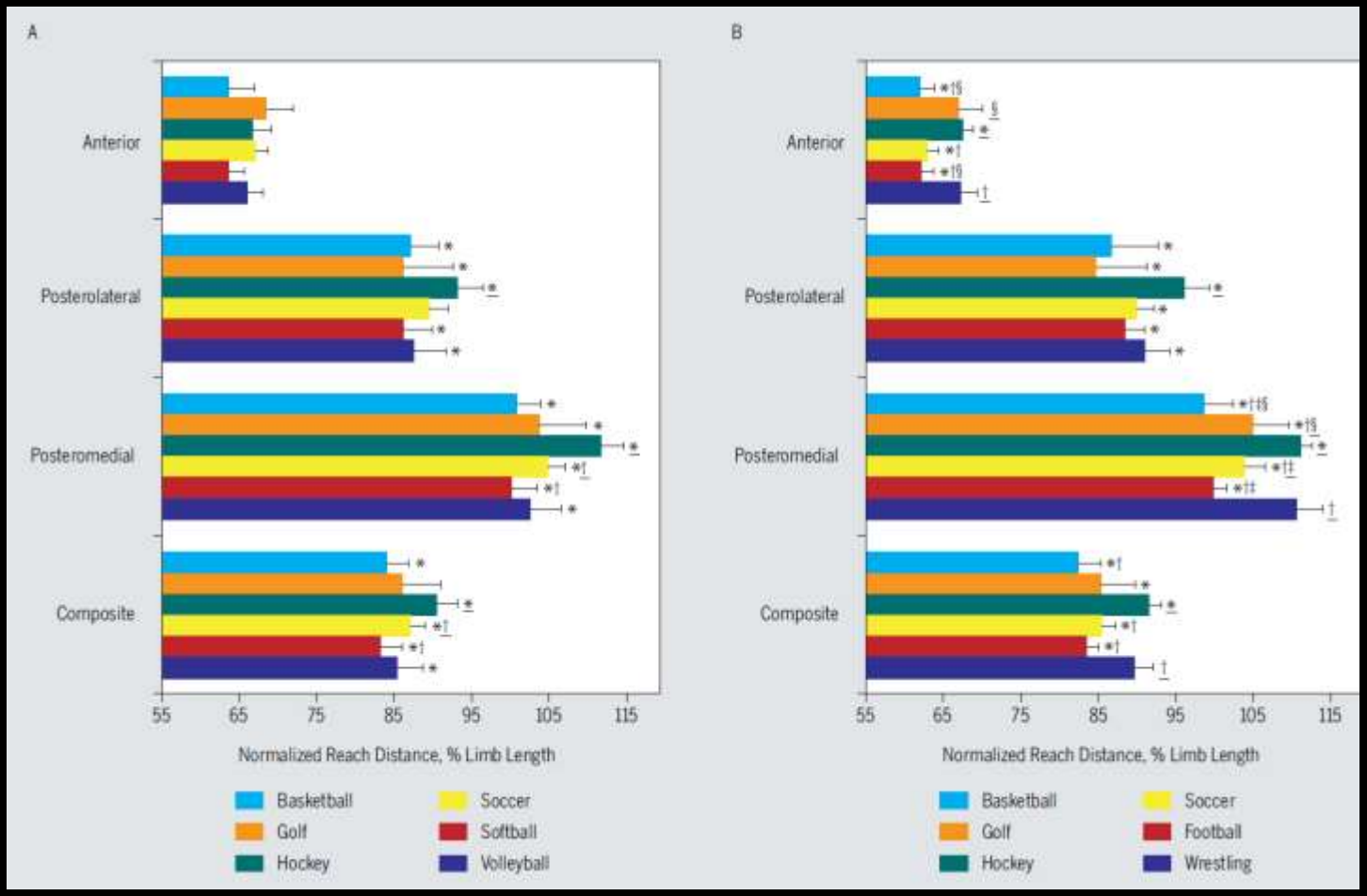


Star Excursion Balance Test (Gribble 2003) : valutazione equilibrio funzionale dinamico.

MIKEL R. STIFFLER, MS[1,2] • JENNIFER L. SANFILIPPO, LAT, MS[2,3]
M. ALISON BROOKS, MD, MPH[1,2] • BRYAN C. HEIDERSCHEIT, PT, PhD[1,2]

Star Excursion Balance Test Performance Varies by Sport in Healthy Division I Collegiate Athletes

| OCTOBER 2015 | VOLUME 45 | NUMBER 10 | JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY



Medicine Ball Throw (Shinkle 2012): valutazione transfer motorio tra tratto assile ed appendicolare attraverso la muscolatura del core durante il lancio della palla medica in modalità variabile

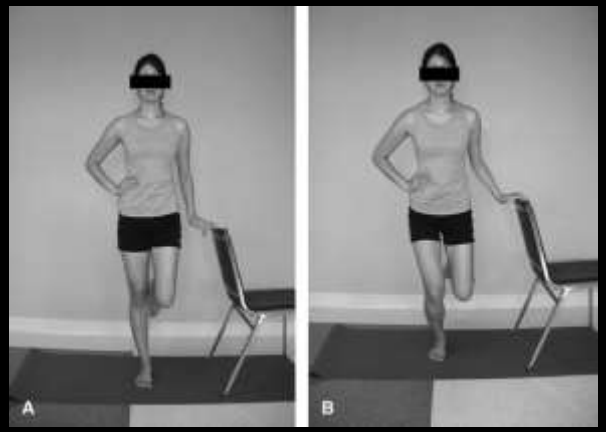
Correlazione statisticamente significativa tra *"push press power test"* e:

- Static reverse
- Static left
- Static right
- Dynamic left
- Dynamic right

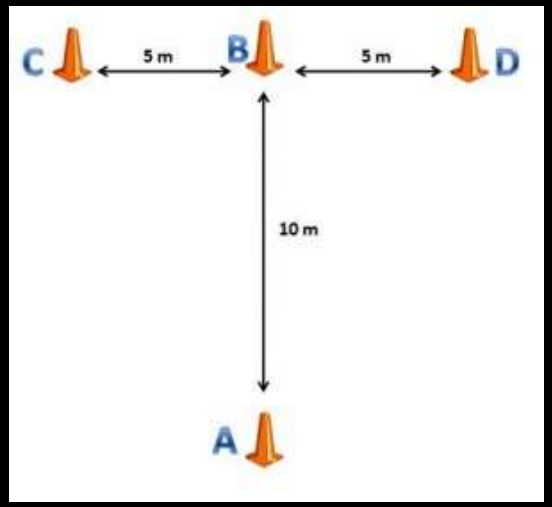
… un adeguato livello di forza degli arti inferiori consente crea un effetto motorio trasferito agli arti superiori attraverso la muscolatura del core…

CORE TRAINING AND FUNCTIONAL TRAINING:

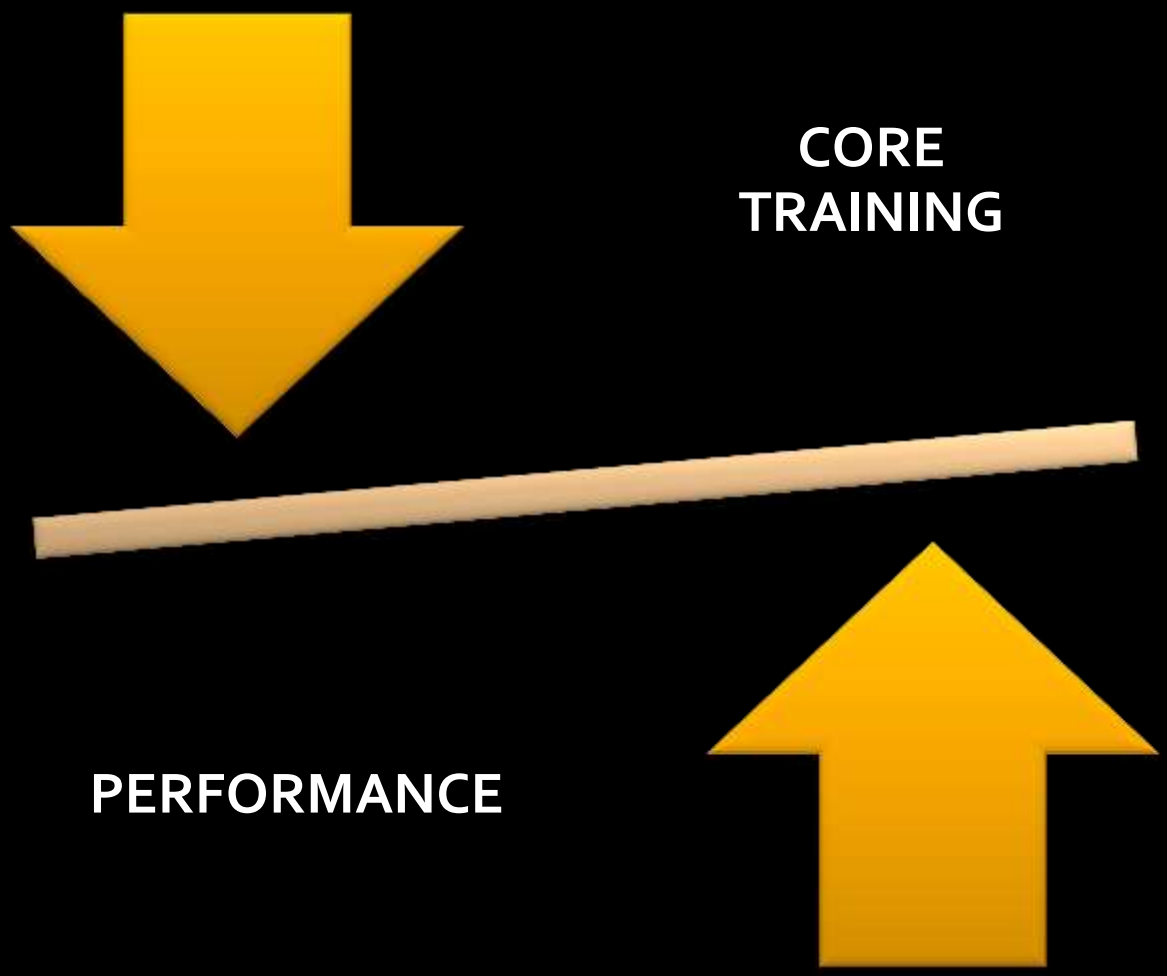
TEST " On Field"



- *1 minute Sit up*
- *1 minute curl up*
- *Single leg squat*
- *1 minute Push Up*
- *Prone Quadra-ped core Test*
- *Vertical Jump*
- *Medicine Ball throw*
- *Agility T Test*
- *Sit and reach test*
- *1 leg static balance test*



Oliver 2009 – Di Stefano 2013


CORE
TRAINING
PERFORMANCE

Dott.Belli Guido

Core Training and Performance

CORE TRAINING ? PERFORMANCE

"...altough the media portrays the idea that enhanced core ability could improve athletic performance, the scientific community reamains uncertain about this relationship..."

Sharrock 2011

Journal of Strength and Conditioning Research, 2007, 21(3), 979–985

Brief Review

CORE STABILITY TRAINING: APPLICATIONS TO SPORTS CONDITIONING PROGRAMS

JEFFREY M. WILLARDSON

Physical Education Department, Eastern Illinois University, Charleston, Illinois 61920

REVIEW ARTICLE

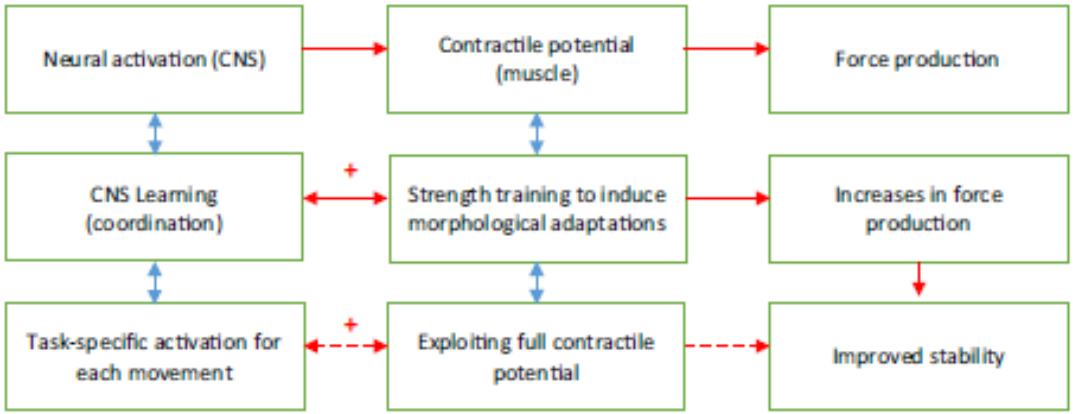
Sports Med 2008; 38 (12): 995-1008
0112-1642/08/0012-0995/$48.00/0

Optimizing Performance by Improving Core Stability and Core Strength

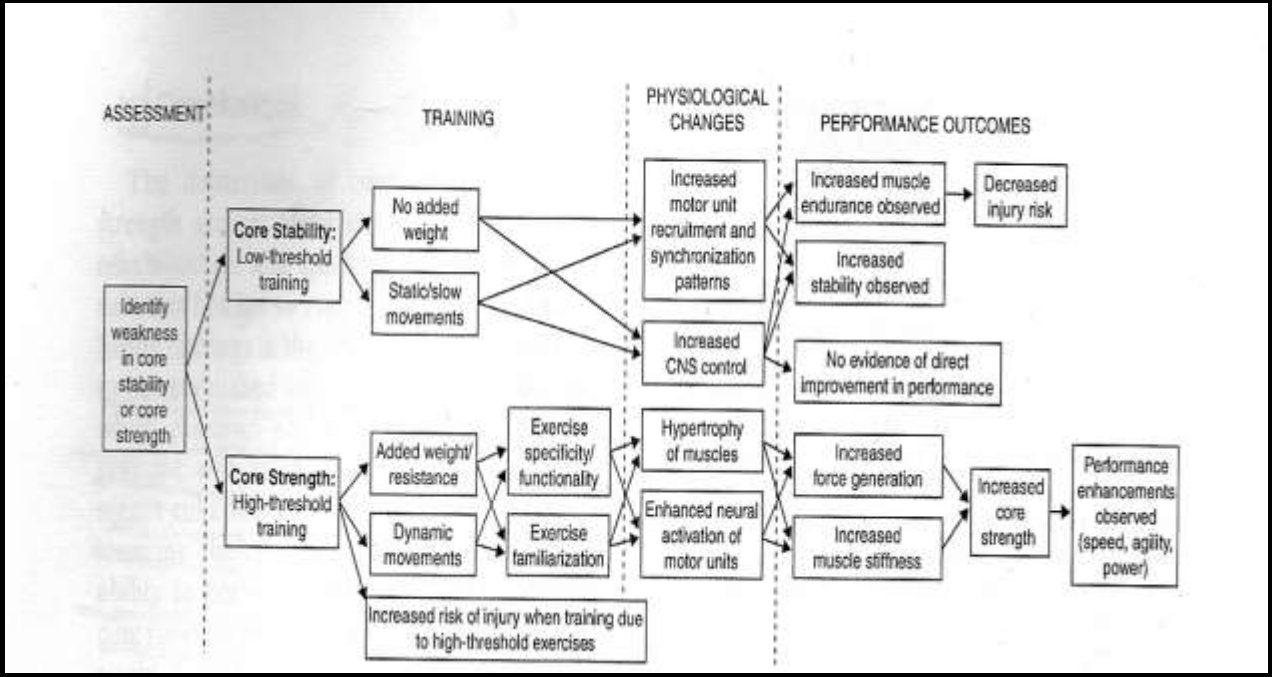
Angela E. Hibbs,[1,3] *Kevin G. Thompson,*[1,4] *Duncan French,*[1] *Allan Wrigley*[2] and *Iain Spears*[3]

1 English Institute of Sport, Gateshead, UK
2 Canadian Sport Centre Pacific, Vancouver, British Columbia, Canada
3 University of Teesside, Middlesbrough, UK
4 School of Psychology and Sports Science, Northumbria University, Newcastle, UK

Fig. 1 Schematic representation of the association between force production and stability



Wirth 2017



Hibbs 2008

"The lack of effect on performance observed in many studies may be due to the core trainings programmes not being functional enough to translate into improvements in sporting performance as a result of the poor understanding of the role that specific muscles have during these exrcises…" **Hibbs 2008**

"Core stability is an integrated , functional motor task and training should reflect this according to movement patterns, forces, torque and velocity…" **Clark 2018**

IJSPT

ORIGINAL RESEARCH

A PILOT STUDY OF CORE STABILITY AND ATHLETIC PERFORMANCE: IS THERE A RELATIONSHIP?

Chris Sharrock, DPT, CSCS[1]
Jarrod Cropper, DPT[1]
Joel Mostad, DPT[1]
Matt Johnson, DPT[1]
Terry Malone, PT, EdD, ATC, FAPTA[2]

SYSTEMATIC REVIEW

Sports Med 2012; 42 (8): 697-706
0112-1642/12/0008-0697/$49.95/0

The Effects of Isolated and Integrated 'Core Stability' Training on Athletic Performance Measures

A Systematic Review

Casey A. Reed,[1,2] *Kevin R. Ford,*[1,3,4] *Gregory D. Myer*[1,3,5,6,7] and *Timothy E. Hewett*[1,2,3,8]

- There is little evidence tying core stability to athletic performance.
- Core training is an integral part of many athletic development training programmes.
- Improvements in general performance are not directly attributable to core training alone.
- Movements and sports with strong core components such as golf, swinging a bat or running show the greatest improvements from core training.

Further target studies are necessary to fully define the connection of core strength and stability to athletic performance.

Sports Med
DOI 10.1007/s40279-015-0426-4

SYSTEMATIC REVIEW

The Role of Trunk Muscle Strength for Physical Fitness and Athletic Performance in Trained Individuals: A Systematic Review and Meta-Analysis

Olaf Prieske[1] · Thomas Muehlbauer[1] · Urs Granacher[1]

- Meta-analisi su 15 studi di correlazione e 16 studi di intervento
- 955 atleti sani di vario livello e disciplina sportiva
- Analisi dell'associazione tra TMS performance (Forza muscolare, Potenza muscolare, Balance, Parametri Atletici)
- Efficacia del CST nel miglioramento di TMS e performance

- Livello medio di qualità delle evidenze (Scala PEDro: 4)
- TMS – Performance: small-sized association
- TMS maggiormente correlata alla forza muscolare in atleti di livello inferiore rispetto a quelli di livello superiore
- CST efficace nel miglioramento di TMS rispetto ad altre forme di training
- CST – Performance: small effects

Key Points

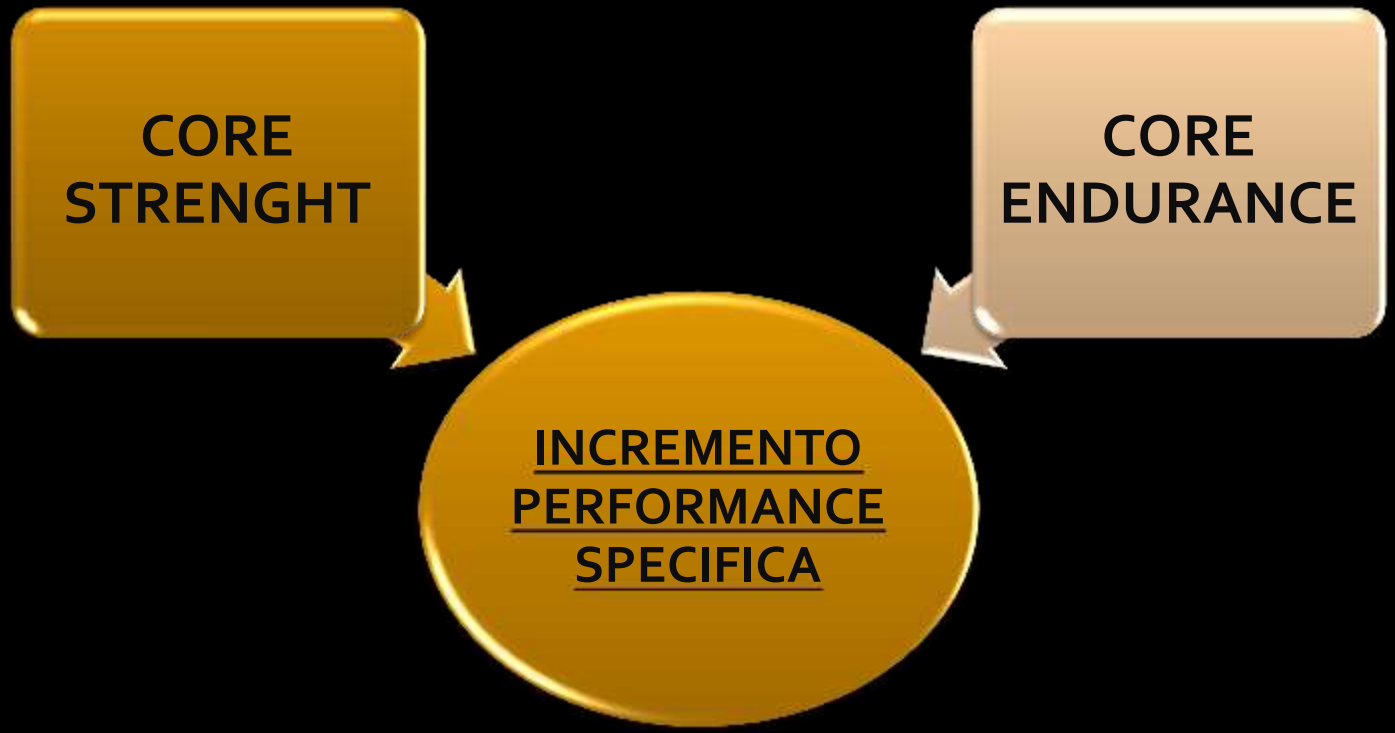
The present systematic review and meta-analysis characterized and quantified associations between measures of trunk muscle strength (TMS), physical fitness, and athletic performance and investigated the effects of core strength training (CST) versus no training, regular training only or alternative training on fitness and performance measures in healthy trained individuals.

Irrespective of the athletes' expertise level, our analyses revealed small-sized correlations for TMS with lower limb muscle strength, muscle power, balance, and athletic performance.

When compared with no training or regular training only, CST induced large effects on TMS but small to medium effects on physical fitness and athletic performance measures in trained individuals. However, small effects were detected for CST as compared with alternative training.

Our findings indicate that TMS plays only a minor role in physical fitness and athletic performance in trained individuals. Further, it appears that CST is an effective means to increase TMS but is associated with only limited gains in physical fitness as well as athletic performance and that CST is not superior to alternative training regimens.

- Se si considerano solo le ricerche qualitativamente superiori (PEDro>6), l'effetto del CST sulla performance rispetto ad altre forme di training incrementa da small a medium / large
- Le modalità valutative di TMS non corrispondono spesso alle richieste performance-specifiche (statico vs dinamico)
- La coordinazione inter ed intramuscolare sono maggiormente collegate alla performance rispetto ai livello di forza massima (qualità vs quantità)
- Livello dell'atleta (elite vs recreational) e l'età (junior vs senior) presentano differenze importanti



- Miglioramento livelli di forza arti superiori ed inferiori
- Incrementi forza ed endurance nella regione del core
- Miglioramento capacità di ricevere, assorbire e trasferire energia dai segmenti corporei prossimali a quelli distali
- Incremento forza torsionale del tronco in movimenti multisegmentali come il lanciare, calciare, tuffarsi
- Aumento sinergismi coordinativi e controllo neuromuscolare globale
- Benefici a livello preventivo e rieducativo

Myer 2006, Saterbakken 2010

IJSPT

SYSTEMATIC REVIEW

THE IMPACT OF LUMBOPELVIC CONTROL ON OVERHEAD PERFORMANCE AND SHOULDER INJURY IN OVERHEAD ATHLETES: A SYSTEMATIC REVIEW

Thane Cope[1]
Sarah Wechter[1]
Michaella Stucky[1]
Corey Thomas[1]
Mark Wilhelm[1]

The International Journal of Sports Physical Therapy | Volume 14, Number 4 | August 2019 | Page 500
DOI: 10.26603/ijspt20190500

ABSTRACT

Background: The lumbopelvic region is utilized in almost all functional tasks and has been proposed to provide dynamic stability to distal extremities.

Purpose: To systematically evaluate the current literature that examined the effect of lumbopelvic control on overhead performance and shoulder injury in overhead athletes.

Study Design: Systematic Review

Methods: A comprehensive systematic electronic search was conducted using PubMed, CINAHL, ProQuest, Scopus, and SPORTDiscus. Articles were considered for inclusion if they included a measure of lumbopelvic control and assessed shoulder pain, disability, injury, or overhead performance outcome. Cohen's *d* effect size was calculated when necessary statistical data were available to determine the impact of lumbopelvic control.

Results: The search revealed 3,312 total articles and 2,883 articles were screened after duplicates were removed. After titles and abstracts were screened, 45 full text articles were reviewed. Fifteen full-text articles ultimately met inclusion criteria. Effect sizes ranged from trivial (0.10) to large (0.86), indicating a varying degree of positive effects on performance and shoulder injuries. The majority of included articles concluded individuals with greater lumbopelvic control demonstrated improved performance and decreased occurrence of injury.

Conclusion: Results suggest that improved lumbopelvic control relates to improved athletic performance and decreased shoulder injury. Additional higher quality research is needed to further support these findings, establish a standard measure for lumbopelvic control, and determine preventative factors for injury, pain, and disability.

Level of Evidence: 2a


Injury Prevention


BAD
POOR
AVERAGE
GOOD
EXCELLENT
PERFORMANCE

Core Stability Training for Injury Prevention

Kellie C. Huxel Bliven, PhD, AT,*† and Barton E. Anderson, MS, ATC, AT†

Sports Health: A Multidisciplinary Approach OnlineFirst, published on March 25, 2013 as doi:10.1177/1941738113481200

Table 1. Common components of injury prevention programs

Core stabilization exercises[33,55,59,60]	Plank Side bridge Supine bridge
Balance exercises[33,55,59]	Single-leg stance Single-leg stance partner toss/catch Single-leg stance on wobble board
Jump training/ plyometric exercises[22,33,55,59,60]	Forward/backward double-leg jumps Forward and backward single-leg jumps Lateral double-leg jumps Lateral single-leg jumps Single-leg zig-zag jumps Bounding
General strengthening exercises[22,33,60]	Lunges Body weight squats Nordic hamstring curls

CONCLUSION

Core stability focuses on maintenance of neutral spinal alignment, optimal trunk position, and the transfer of loads along the kinetic chain. A variety of assessment tools can be utilized to evaluate core stability. A multifaceted approach is recommended utilizing tests for muscle recruitment, endurance, neuromuscular control, and fundamental functional movement patterns. Core stability should be trained in a progressive fashion, beginning with local muscle recruitment, moving to core stabilization in a variety of postures, and then transitioning into total body dynamic movements.

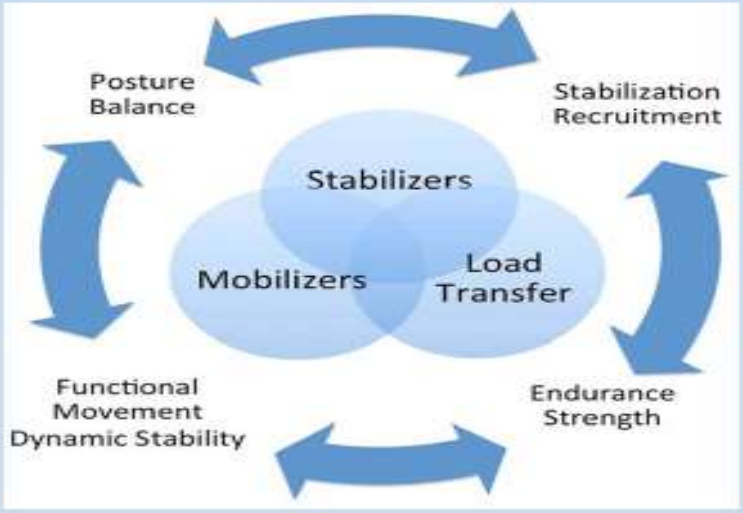


Figure 1. Functional core stability. This figure illustrates the various components and roles that interact to achieve functional core stabilization.

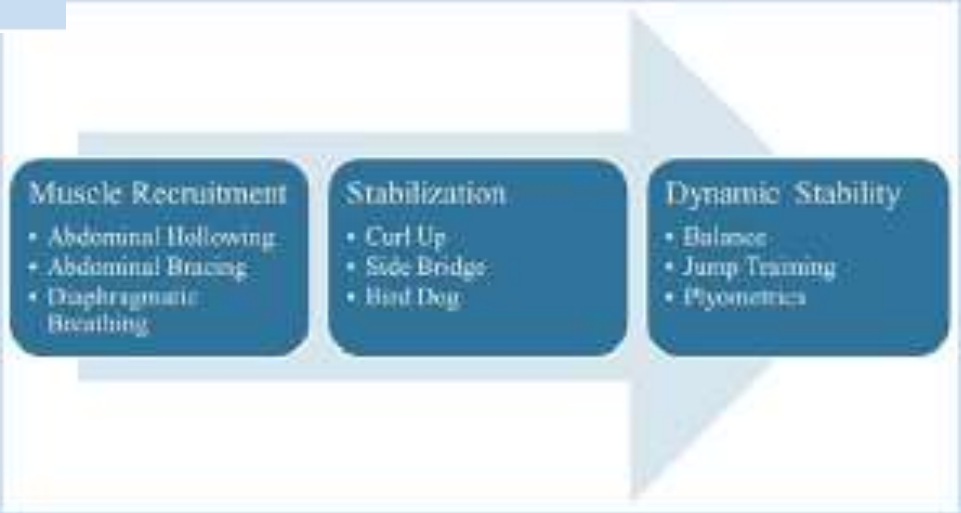


Figure 5. Sample core stability training program progression.

Core Stability: Basic Exercises

Tramite esercizi di:

- *plank*

- *bird dog*

- *bridge*

- *side plank*

- *dead bug*

(Andorlini, 2013)

Dott.Belli Guido

Esercizi di Balance e Core Strength con elastici

Dott.Belli Guido

Static Twist

DynamicTwist

Dott.Belli Guido



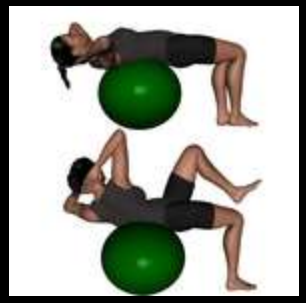
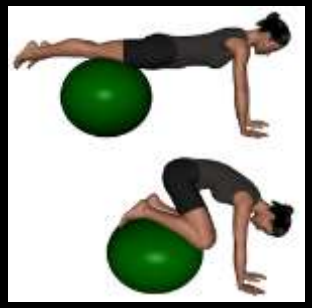


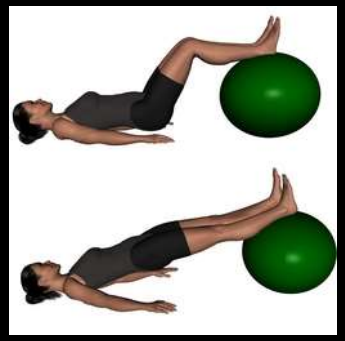
Push up



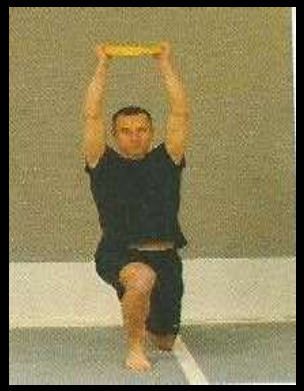
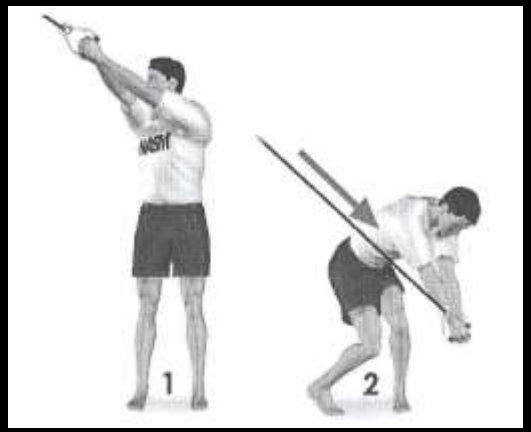
Side Bridge

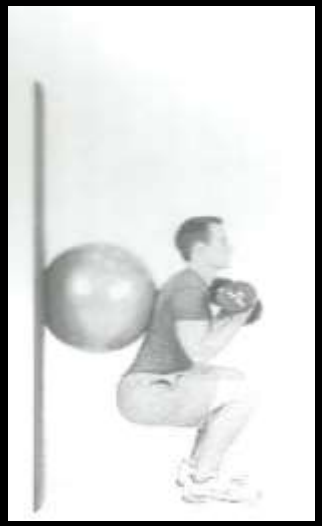
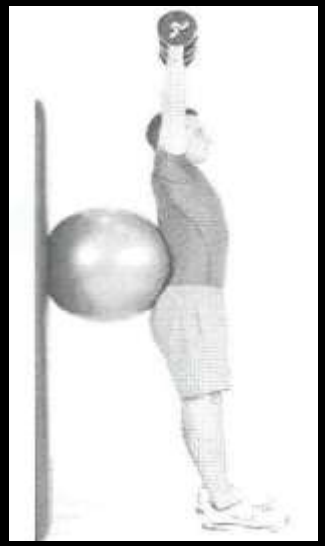
Esercizi di integrazione Core – Arti superiori ed inferiori

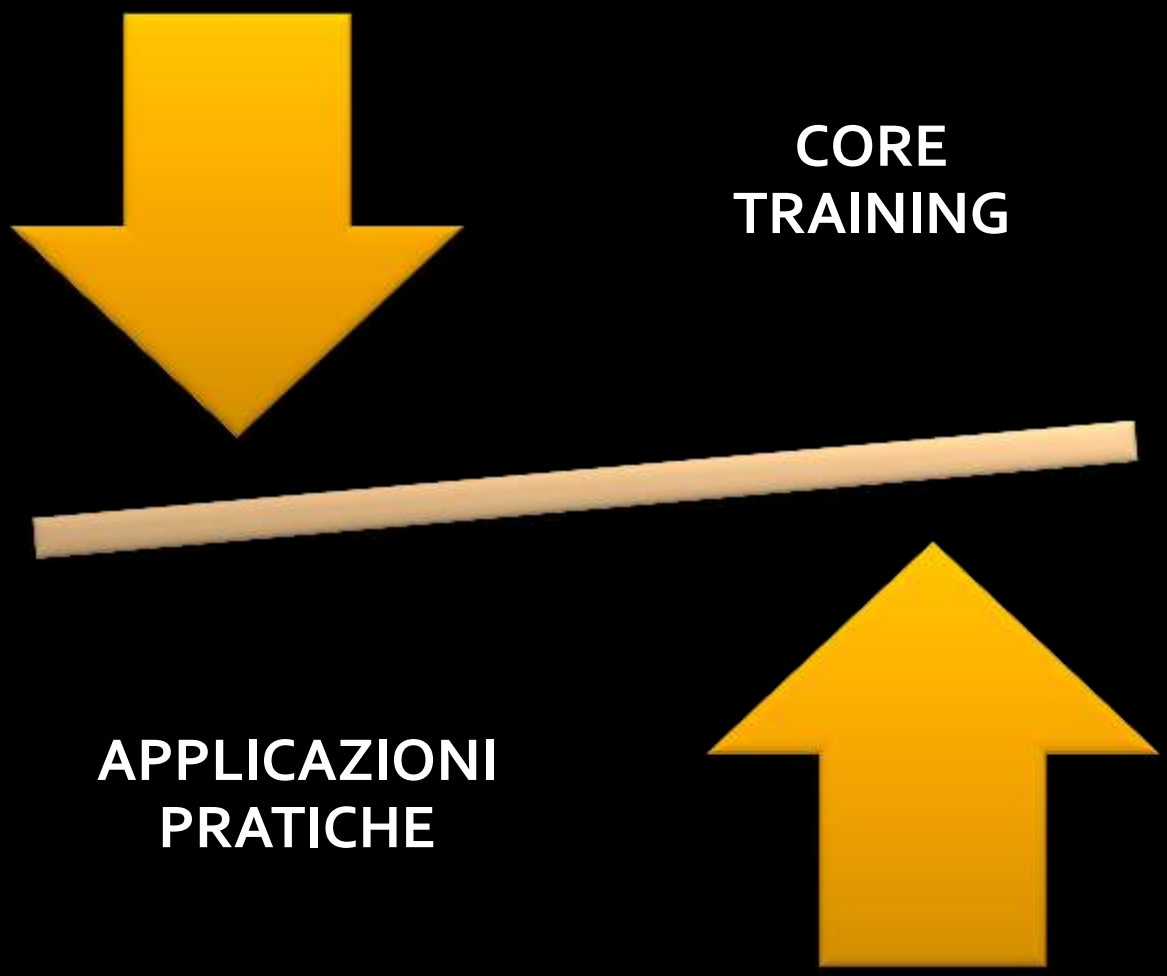






CORE
TRAINING
APPLICAZIONI
PRATICHE


FUNCTIONAL TRAINING
LAVORO CONDIZIONALE SPORT SPECIFICO
CORE TRAINING
LAVORO DI CARATTERE PREVENTIVO
RIEDUCAZIONE - RIATLETIZZAZIONE

Applicazioni pratiche

- ESERCIZI IN PROGRESSIONE DAI DECUBITI ALL'ORTOSTATISMO
- UTILIZZO DI PESI LIBERI PIUTTOSTO CHE MACCHINE DI MUSCOLAZIONE
- UTILIZZO DELL'INSTABILITA' COME STIMOLO ALLENANTE
- UTILIZZO DI CARICHI ASIMMETRICI E MONOLATERALI PIUTTOSTO CHE BILATERALI
- MODULAZIONE DELLA COMPONENTE TORSIONALE DEL TRONCO
- RIDUZIONE DEL NUMERO DEGLI APPOGGI
- PROGRESSIONE DA ESERCIZI MONOPLANARI ALLA TRIPLANARIETA'

Willardson 2007, Saeterbakken 2012, Andorlini 2013

International Journal of
Environmental Research and Public Health

MDPI

Review

Core Muscle Activity during Physical Fitness Exercises: A Systematic Review

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* Correspondence: josemuyor@ual.es

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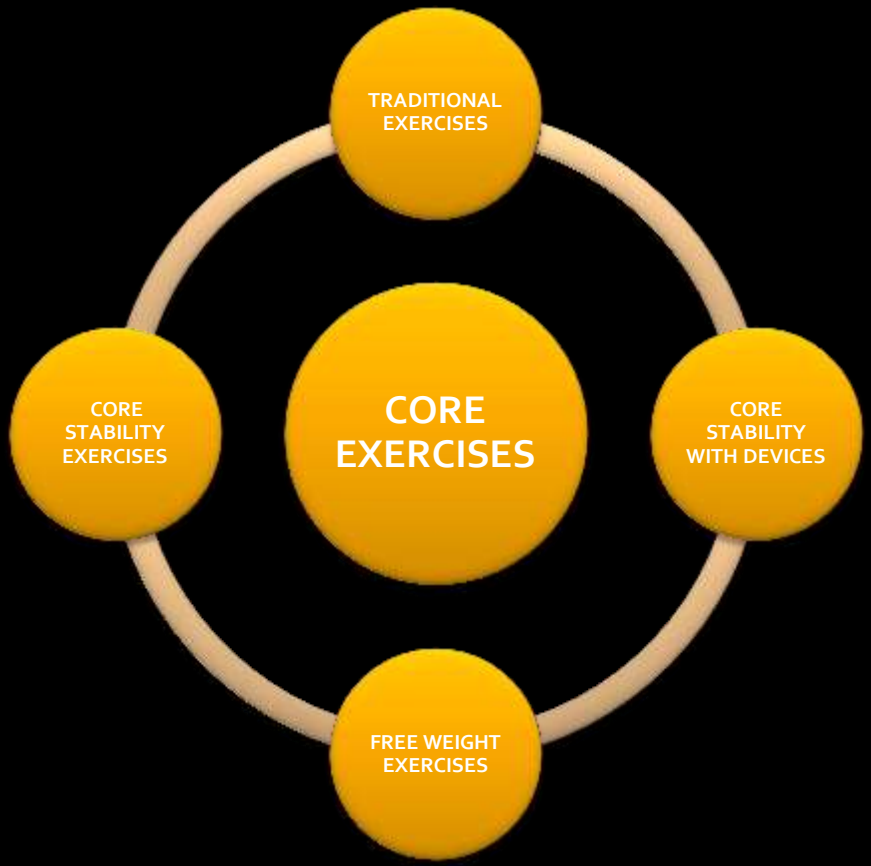
check for updates

Revisione sistematica della letteratura:

- 67 ricerche
- Varie tipologie di esercizi
- Analisi EMG a livello di RA, OE, OI, ES, MUL, TA.



RA

IO

EO

ES

MUL

TA

5. Practical Applications

This systematic review provided a selection of exercises for greater activation of each core muscle group based on four different types of exercise (traditional core exercises, stability exercises, core exercises on a ball/device, and free-weight exercises) to assist strength and conditioning coaches, as well as fitness professionals. For example, free-weight exercises, such as the unstable Bulgarian squat, the regular back squat, roll-out plank, and the suspended front plank are suggested for RA activation. The front plank with scapular adduction and the posterior pelvic tilt, which belongs to the core stability exercise group, can be recommended for developing IO activation. Climax laughter exercises and kettlebell swings with "Kime" could be another alternative for IO activation (although swing exercises may be contraindicated for people with spine shear load intolerance). With regard to EO, unilateral free-weight exercises, such as the Bulgarian squat or the standing unilateral dumbbell press are recommended. Likewise, the front plank on a Swiss ball with the variant of moving the forearms in a continuous clockwise fashion (stir-the-pot) or doing a hip extension while maintaining stability are alternative exercises for this purpose. When it comes to the ES, free-weight exercises (e.g., the deadlift, hip-thrust, or back squat), the back extension on the floor, or the variant one-legged back extension, along with suspended bridge exercises, significantly increase EMG activity. To increase MUL activation, we suggest trunk extensions (with active lumbopelvic control), the front plank on a Swiss ball with the hip extension exercise, and free-weight exercises, such as the 45% bodyweight bent-over row, the 75% bodyweight deadlift, and 75% body weight back-squat exercises. Even though the greatest activation of the TA was reported with suspension training systems using the side-lying lumbar setting in the sling exercise, we instead suggest prone and supine sling exercises in order to stabilize the lumbar region, given its high local/global muscle ratio.

6. Conclusions

This study systematically reviewed the current literature on the EMG activity in six core muscles during core physical fitness exercises. The greatest activity in the RA, EO, and ES muscles was found in free-weight exercises. The greatest IO activity was found in core stability exercises, while traditional exercises showed the greatest MUL activation. However, there was a lack of research on TA activation during core physical fitness exercises and a lack of consistency between studies when applying methods to measure EMG activity. In addition, the level of evidence of the included studies was mainly moderate, which suggests that more high-quality research is necessary in order to the reduce the risk of bias and draw solid conclusions about core muscle activity.

Applicazioni pratiche

Willardson 2010

Core Training: periodizzazione

CORE STABILITY

Esercizi di stabilizzazione lombo-pelvica in differenti posizioni

CORE ENDURANCE

- Esercizi isometrici a bassa soglia di carico in condizioni di instabilità

CORE STRENGHT

- Esercizi dinamici a alta soglia di carico in condizioni di stabilità

CORE POWER

- Esercizi dinamici eseguiti con carichi variabili alla massima velocità in condizioni di stabilità

Willardson 2010

Core Training: periodizzazione

FASE PRE SEASON / IN SEASON

- Sviluppo della core strenght
- Alta specificità dei contenuti
- Lavori dinamici con carichi ad alta soglia
- Movimenti globali in condizioni di stabilità

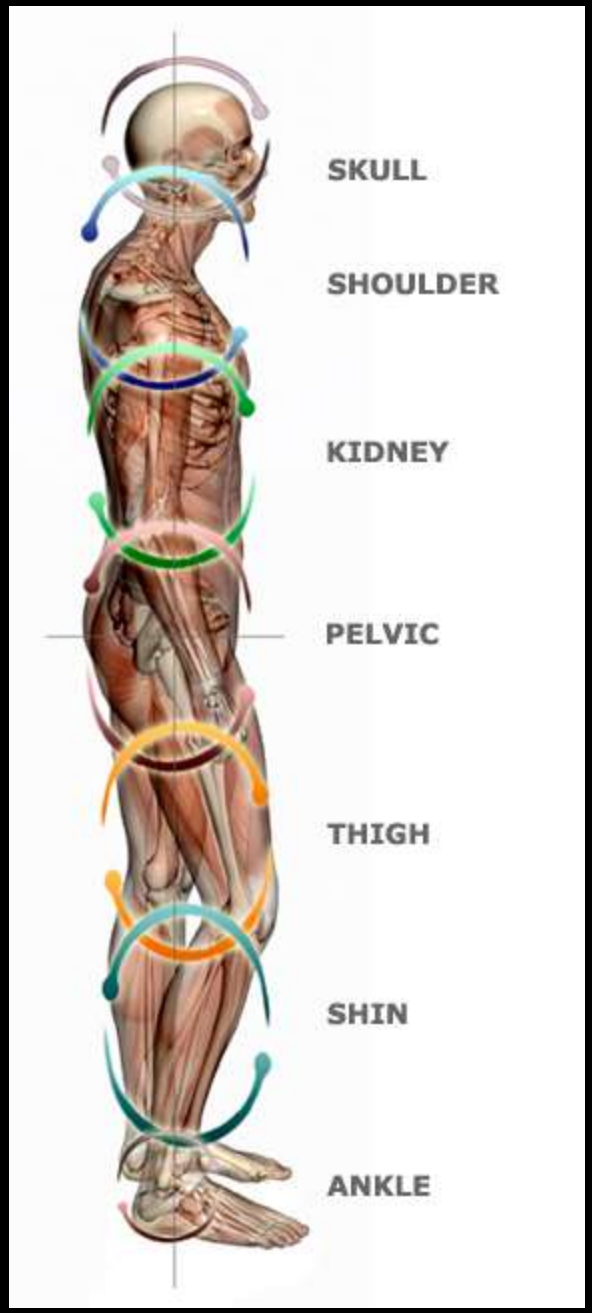
FASE POST SEASON / OFF SEASON

- Sviluppo della core endurance e core stability
- Minor specificità dei contenuti
- Lavori statici a bassa soglia di carico
- Utilizzo di superfici instabili

Willardson 2007

- La ricerca sul tema del *core training* ha prodotto un enorme numero di studi negli ultimi 20 anni con pubblicazioni qualitativamente variabili
- Nonostante tale volume non è ancora possibile estrapolare dati scientifici validi per poter ottenere conclusioni universalmente condivise
- L'eterogeneità di approcci scientifici e modalità di ricerca rende infatti difficile un confronto metodologico corretto anche nelle principali revisioni sistematiche
- Tale difficoltà si allinea perfettamente con la complessa natura del core, le sue numerose possibilità applicative e l'infinità di programmi di allenamento sviluppabili
- Una conoscenza adeguata su tale argomento, unita ad una giusta dose di buon senso ed al rispetto dei principi basilari di biomeccanica e metodologia allenante, permette di realizzare un percorso di core training ottimale per qualunque soggetto…

Ricerca scientifica e lavoro sul campo rappresentano un "link" fondamentale per ottimizzare le metodologie di lavoro…
Tuttavia, pur non essendo sempre un matrimonio "possibile" e di facile comprensione, occorre cogliere spunti e idee da poter applicare nei vari contesti professionali e sportivi, adattandoli nelle giuste forme e misure…
Atleti professionisti, dilettanti ed amatori rappresentano infatti un patrimonio importante verso cui approcciarsi con la massima professionalità , consapevoli che metodi di allenamento ed esercizi per gli uni possono risultare totalmente inadeguati e potenzialmente dannosi per gli altri…
Il vissuto motorio ed i prerequisiti specifici in ciascun contesto devono dunque essere la linea guida per un EXERCISE SETTING il più efficace possibile….



...grazie
dell'attenzione....

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