Rückenzentrum
DIAGNOSTIK • THERAPIE • PRÄVENTION

Dezember 2013

8. Deutscher Wirbelsäulenkongress 2013 Frankfurt am Main

DGW-Arbeitsgruppe Konservative Wirbelsäulentherapie:

Lumbo-sakrale Instabilität

Ulf Marnitz & Melvin Mohokum, Rückenzentrum am Markgrafenpark, Berlin

Joachim Mallwitz & Michael Richter, Rückenzentrum am Michel, Hamburg

Anke Steinmetz, Uniklinikum Halle, Klinik für Orthopädie und Physikalische Medizin

Gliederung

- Definition
- Literaturrecherche
  1. ISG
  2. LWS
- Ergebnis
- Zusammenfassung
- Ausblick

Rückenzentrum
DIAGNOSTIK • THERAPIE • PRÄVENTION

Dezember 2013

Idee:

Entwicklung einer eigenen Handlungrichtlinie mit dem Thema „Lumbosakrale Instabilität“

www.dwg.org

Ulf Marnitz www.ruecken-zentrum.de

Rückenzentrum
DIAGNOSTIK • THERAPIE • PRÄVENTION

Dezember 2013

Gesetzt:

Programm für Nationale VersorgungsLeitlinien

Träger:

Bundesärztekammer

Kassenärztliche Bundesvereinigung

Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften

Nationale VersorgungsLeitlinie

Kreuzschmerz

Langfassung

Konsultationsfassung

Version Konsultation 1.0
16. März 2010

Ergänzungen und Modifikationen der Leitlinie sind über die Webseite http://www.kreuzschmerz.versorgungsleitlinien.de zugänglich.

Rückenzentrum
DIAGNOSTIK • THERAPIE • PRÄVENTION

Dezember 2013

Nichtmedikamentöse und invasive Therapieverfahren bei nichtspezifischem Kreuzschmerz (KS) – Indikationen[1]

	Akuter KS	Chronischer KS
Akupunktur	keine **(A)**	**sehr eingeschränkt (0)**
Bettruhe	keine **(A)**	keine **(A)**
Bewegungs-therapie	• **körperliche Aktivität beibehalten (A)** • keine Verordnung von Bewegungstherapie (auch Krankengymnastik) **(A)**	**Bewegungstherapie als primäre Behandlung (A)**
Interferenz-therapie	keine bei akut/subakut **(A)**	keine **(A)**
PENS	keine **(A)**	keine **(A)**
TENS	keine **(A)**	keine **(B)**
Progressive Muskel-relaxation	**kann angeboten werden bei akutem/subakutem KS und erhöhtem Chronifizierungsrisiko (0)**	**sollte angewendet werden (B)**
Ergotherapie	keine **(A)**	**sollte angewendet werden im Rahmen multimodaler Behandlungsprogramme (B)**
Kurzwellen-diathermie	keine **(A)**	keine **(A)**
Tiefenstabilisation	**soll bei akutem/subakutem KS durchgeführt werden (A)**	**soll durchgeführt werden (A)**

Ulf Marnitz www.ruecken-zentrum.de

Definition
„Segmentale Instabilität“

“…instability at the spinal segmental level is a loss of control or excessive motion in the spinal segment’s neutral zone…“ [a]

[a] ´Panjabi 1992

Einschlusskriterien

- in-vivo Studien
- Pathologie
- Lokalisation ISG oder LWS
- spezifisches, gezieltes Training der lumbalen Tiefenmuskulatur

Ausschlusskriterien

- Studien an Tiermodellen
- Leichenstudien
- in-vitro Studien (z.B. biomechanische Modelle)
- Andere Verfahren
  - Chirotherapie/Manipulationen
  - Osteopathie

1. ISG-Instabilität

Literaturrecherche – ISG-Instabilität

Suchbegriffe	Treffer	In	Out
sacroiliac joint AND **multifidus**	6	2	4
lumbo pelvic stability	33	3	30
sacroiliac joint laxity	14	0	14
multifidus AND **piriformis**	0	0	0
core stability AND **piriformis**	0	0	0
multifidus AND **iliopsoas**	2	0	2
lumbar multifidus AND **gluteaus**	2	0	2
Ergebnis	**57**	**5**	**52**

Quelle: Medline
Stand Juni 2013

Ergebnis

- geringe Trefferanzahl
- thematisch sehr heterogene Studienlage
- Messverfahren: EMG, Ultraschall, Dehnungstest, Vibrationen, VAS, Funktionsfragebogen
- häufig Annahme H1-Hypothese (diese wird häufig bestätigt)
- Bestmögliche Evidenz: Buchempfehlung von Andry Vleeming 2007: Movement, Stability and Lumbopelvic Pain: Integration of Research und Therapy
- Meta-Analyse Spine 2013: s. nächste Seite

2. LWS-Instabilität

Rückenzentrum
DIAGNOSTIK • THERAPIE • PRÄVENTION

Dezember 2013

Literaturrecherche

Eingabe Suchbegriffe

NCBI Resources How To

PubMed.gov
US National Library of Medicine
National Institutes of Health

PubMed | low back pain AND multifidus

RSS Save search Advanced

Show additional filters

Article types
Clinical Trial
Review
More ...

Text availability
Abstract available
Free full text available
Full text available

Publication dates
5 years
10 years
Custom range...

Species
Humans
Other Animals

Clear all

Show additional filters

Display Settings: Summary, 20 per page, Sorted by Recently Added

Send to:

Results: 1 to 20 of 254

<< First < Prev Page 1 of 13 Next > Last >>

1. Comparison of trunk muscle activity during bridging exercises using a sling in patients with **low back pain**.
   Kang H, Jung J, Yu J.
   J Sports Sci Med. 2012 Sep 1;11(3):510-5.
   PMID: 24149361 [PubMed]
   Related citations

2. Effects of stabilization exercise using a ball on mutifidus cross-sectional area in patients with chronic **low back pain**.
   Chung S, Lee J, Yoon J.
   J Sports Sci Med. 2013 Sep 1;12(3):533-41.
   PMID: 24149162 [PubMed]
   Related citations

3. Changes in gait kinematics and lower **back** muscle activity post-radiofrequency denervation of the zygapophysial joint: a case study.
   Stegemöller EL, Roper J, Hass CJ, Kennedy DJ.
   Spine J. 2013 Oct 10. doi:pii: S1529-9430(13)00747-X. 10.1016/j.spinee.2013.06.061. [Epub ahead of print]
   PMID: 24120824 [PubMed - as supplied by publisher]
   Related citations

4. Paraspinal Muscle Morphology and Composition: A 15-Year Longitudinal MRI Study.
   Fortin M, Videman T, Gibbons LE, Battié MC

Titel und Abstract lesen

Spine (Phila Pa 1976). 2002 Feb 15;27(4):399-405.

The relation between the transversus abdominis mus , sacroiliac joint mechanics, and low back pain.

Richardson CA, Snijders CJ, Hides JA, Damen L, Pas MS, Storm J.
Institute of Rehabilitation, University Hospital Rotterdam, the Netherlands. c.rich shrs.uq.edu.au

Abstract

STUDY DESIGN: Two abdominal muscle patterns were tested in the same group of individuals, and their effects were compared in relation to sacroiliac joint laxity. One pattern was contraction of the transversus abdominis, independently of the other abdominals; the other was a bracing action that used all the lateral abdominal muscles.

OBJECTIVES: To demonstrate the biomechanical effect of the exercise for the transversus abdominis known to be effective in low back pain.

SUMMARY OF BACKGROUND DATA: Drawing in the abdominal wall is a specific exercise for the transversus abdominis muscle (in cocontraction with the multifidus), which is used in the treatment of back pain. Clinical effectiveness has been demonstrated to be a reduction of 3-year recurrence from 75% to 35%. To the authors' best knowledge, there is not yet in vivo proof of the biomechanical effect of this specific exercise. This study of a biomechanical model on the mechanics of the sacroiliac joint, however, predicted a significant effect of transversus abdominis muscle force.

METHODS: Thirteen healthy individuals who could perform the test patterns were included. Sacroiliac joint laxity values were recorded with study participants in the prone position during the two abdominal muscle patterns. The values were recorded by means of Doppler imaging of vibrations. Simultaneous electromyographic recordings and ultrasound imaging were used to verify the two muscle patterns.

RESULTS: The range of sacroiliac joint laxity values observed in this study was comparable with levels found in earlier studies of healthy individuals. These values decreased significantly in all individuals during both muscle patterns ($P < 0.001$). The independent transversus abdominis contraction decreased sacroiliac joint laxity (or rather increased sacroiliac joint stiffness) to a significantly greater degree than the general abdominal exercise pattern ($P < 0.0260$).

CONCLUSIONS: Contraction of the transversus abdominis significantly decreases the laxity of the sacroiliac joint. This decrease in laxity is larger than that caused by a bracing action using all the lateral abdominal muscles. These findings are in line with the authors' biomechanical model predictions and support the use of independent transversus abdominis contractions for the treatment of low back pain.

Relevante Studiendaten extrahieren….

evidence that the cross-sectional area (CSA) of the multifidus is selectively decreased compared with other lumbo-pelvic muscles in patients with chronic LBP (Danneels et al., 2000). Multifidus muscle atrophy has been successfully quantified using MRI and Computerized Tomography (CT) scanning in terms of both decreased muscle CSAs (Barker et al., 2004) and presence of alterations in muscle consistency (due to fatty deposits or fibrous/connective tissue infiltration) and atrophy (Kader et al., 2000). Researchers have used real-time ultrasound imaging to demonstrate segmental decrease in the CSA of the multifidus, ipsilateral to painful symptoms, in patients with acute unilateral LBP (Hides et al., 1994, 1996). A similar localized (rather than generalized) pattern of muscle atrophy of the multifidus muscle has been demonstrated in subjects with chronic LBP with unilateral pain presentations (Hides et al., 2008a; Wallwork et al., 2009). This study also provided evidence of a corresponding reduced ability to voluntarily contract the atrophied muscle (Wallwork et al., 2009).

In the clinical setting, possible methods of testing TrA muscle function involve palpation of the abdominal wall (Hides et al., 2000) and the use of a pressure cuff (pressure biofeedback unit Chattanooga, USA) placed under the abdomen with the patient in a prone lying position (Hides et al., 2004). This test represents an inner range concentric contraction of the TrA muscle to lift the abdominal contents and wall and thereby decrease the pressure in the pressure biofeedback unit. The multifidus muscle can be assessed by the palpation of muscle bulk and by the quality of voluntary contraction at each lumbar vertebral level (Hides et al., 2004). Real-time ultrasound imaging is another method that is used in physiotherapy clinical practice both for assessment of TrA and multifidus muscle function and size as well as for retraining purposes (Bunce et al., 2004; Teyhen et al., 2005; Koppenhaver et al., 2009; Wallwork et al., 2009; Hides et al., 2010).

It would seem from previous research that changes in the TrA and multifidus muscles are common, and may even possibly represent a marker of chronic LBP. However, studies of impairments of the TrA and multifidus muscles have been performed in isolation

2. Methods

2.1. Subjects

Data for this study was based on chart audits from the files of 82 patients (42 females, 40 males) presenting to a hospital based back pain clinic between 1998 and 2005 for assessment and management of chronic LBP. The mean age of the patients was 43.21 ±13.09 years. Patients who attended the clinic during these years and were included in this study had a history of LBP in excess of three months, with LBP defined as pain localized between the T12 vertebral level and the gluteal fold. Individual cases were excluded from review if they met any of the following criteria: previous lumbar surgery, pregnancy, systemic disease plus any reflex and or motor signs of nerve root or cauda equina compression. Written informed consent was obtained from patients during their initial visit to the clinic and the project met ethical requirements of the hospital.

2.2. Procedure

Chart audits were conducted on the archived files of LBP patients from two physiotherapists at the clinic, who were the most experienced in muscle measurement by ultrasound and for whom consistency has been verified by inter-rater and intra-rater reliability (Wallwork et al., 2007). The researcher conducting measurements of the muscle system was blinded to the results of patient questionnaires, which were administered, collected and scored by a research assistant. De-identified audit information from the patients' initial clinical muscle testing and assessment was then entered onto a spreadsheet, including the measures of multifidus muscle contraction, CSA of the multifidus muscle, TrA muscle contraction, and other clinical measures described below.

…Evidenzniveau bestimmen…

CEBM
CENTRE FOR EVIDENCE BASED MEDICINE

UNIVERSITY OF OXFORD

Levels of Evidence (March 2009)

www.cebm.net

Level 1A	Therapy/Prevention, Aetiology/Harm Prognosis Diagnosis Differential diag/symptom prevalence Economic and decision analyses	1a SR (with homogeneity*)of RCTs SR (withhomogeneity*) of inception cohort studies; CDR† validated in different populations SR (with homogeneity*) of Level 1 diagnostic studies; CDR† with 1b studies from different clinical centres SR (with homogeneity*) of prospective cohort studies SR (with homogeneity*) of Level 1 economic studies
Level 1b	Therapy/Prevention, Aetiology/Harm Prognosis Diagnosis Differential diag/symptom prevalence Economic and decision analyses	Individual RCT (with narrow Confidence Interval‡) Individual inception cohort study with > 80% follow-up; CDR† validated in asingle population Validating** cohort study with good††† reference standards; or CDR† tested within one clinical centre Prospective cohort study with good follow-up**** Analysis based on clinically sensible costs or alternatives; systematic review(s) of the evidence; and including multi-way sensitivity analyses
Level 1c	Therapy/Prevention, Aetiology/Harm Prognosis Diagnosis Differential diag/symptom prevalence Economic and decision analyses	All or none§ All or none case series Absolute SpPins and SnNouts†† All or none case-series Absolute better-value or worse-value analyses ††††
Level 2a	Therapy/Prevention, Aetiology/Harm Prognosis Diagnosis Differential diag/symptom prevalence Economic and decision analyses	SR (with homogeneity*) of cohort studies SR (withhomogeneity*) of either retrospective cohort studies or untreated control groups in RCTs SR (with homogeneity*) of Level >2 diagnostic studies SR (with homogeneity*) of 2b and better studies SR (withhomogeneity*) of Level >2 economic studies
Level 2b	Therapy/Prevention, Aetiology/Harm Prognosis Diagnosis	Individual cohort study (including low quality RCT; e.g., <80% followup) Retrospective cohort study or follow-up of untreated control patients in an RCT; Derivation of CDR† or validated on split sample §§§ only Exploratory** cohort study with good††† reference standards; CDR† after derivation, or validated only on split-sample§§§ or databases

…und in Excel-Tabelle eintragen.

Artikel (Autor, Jahr)/ Studien-typ	Anzahl der Patienten /Patientenmerkmale	Intervention /ggf. Nachverfolgung	Vergleichs-intervention	Outcomes	Ergebnisse	Evidenzniveau
Franca 2013/RCT	30 Probanden mit LBP 1. Gruppe: 15 Probanden (Ø Alter 42.07 Jahre, SD 8.15) 2. Gruppe: 15 Probaden (Ø 41.53 Jahre, SD 4.41)	1. Gruppe (SS): 6 Wochen, 2xWochen: segmentale Stabilisation	2. Gruppe (ST): 6 Wochen, 2xWochen: Stetching of erector spinae, hamstrings, triceps surae	Gruppe 1 (Prä-Postvergleich) ● Schmerz: 99% besser* ● Mc Gill:92% besser* ●Oswestry: 90% besser* ● Sensory: 93% besser* ● Affective: 97% besser*	Gruppe 2 (Prä-Postvergleich) ● Schmerz: 49% besser* ● Mc Gill:42% besser* ●Oswestry: 52% besser* ● Sensory: 37% besser* ● Affective: 56% besser*	2b

Literaturrecherche – LWS-Instabilität

Suchbegriffe	Treffer	In	Out	Status
lumbar multifidus AND **low back pain**	209			in Bearbeitung
lumbar stability AND **musculoskeletal**	57			offen
core stability AND **musculoskeletal**	21			offen
segmental control AND **musculoskeletal**	58			offen
segmental control AND **low back pain**	84			offen
transversus abdominis AND **low back pain**	113			offen
lumbar stability AND **low back pain**	225			offen
lumbar stability AND **transversus abdominis**	27			offen
Ergebnis (include duplicates)	**782**			

Quelle: Medline
Stand Oktober 2013

Ergebnisse

- Messverfahren: Ultraschall, MRI, EMG, Fragebögen, etc.
- Zielparameter: Muskeldicke (CSA), Fettinfiltration, Muskelaktivierung, Entspannungsfähigkeit
- Studiendesign: RCTs, Systematische Reviews, Kohortenstudien, Reliabilitätsstudien
- Evidenzniveau

Weitere Auswertung steht aus!

Spine

SPINE Volume 38, Number 6, pp E350–E358
©2013, Lippincott Williams & Wilkins

· 2013

LITERATURE REVIEW

Motor Control Exercises Reduces Pain and Disability in Chronic and Recurrent Low Back Pain

A Meta-Analysis

Martin Gustaf Byström, RPT, MSc,* Eva Rasmussen-Barr, PhD,*† and Wilhelmus Johannes Andreas Grooten, PhD*‡

Study Design. Meta-analysis of randomized, controlled trials.

Objective. To determine the short-term, intermediate, and long-term effectiveness of MCE, with regard to pain and disability, in patients with chronic and recurrent low-back pain.

Summary of Background Data. Previous meta-analyses have shown no difference between the effects of MCE and general exercise in the treatment of low back pain. Several high quality studies on this topic have been published lately, warranting a new meta-analysis.

Methods. We searched electronic databases up to October 2011 for randomized controlled trials clearly distinguishing MCE from other treatments. We extracted pain and disability outcomes and converted them to a 0 to 100 scale. We used the RevMan5 (Nordic Cochrane Centre, Copenhagen, Denmark) software to perform pooled analyses to determine the weighted mean differences (WMDs) between MCE and 5 different control interventions.

Results. Sixteen studies were included. The pooled results favored MCE compared with general exercise with regard to disability during all time periods (improvement in WMDs ranged from −4.65 to −4.86), and with regard to pain in the short and intermediate term (WMDs were −7.80 and −6.06, respectively). Compared with spinal manual therapy, MCE was superior with regard to disability during all time periods (the WMDs ranged between −5.27 and −6.12), but not with regard to pain. Furthermore, MCE was superior to minimal intervention during all time periods with regard to both pain (the WMDs ranged between −10.18 and −13.32) and disability (the WMDs ranged between −5.62 and −9.00).

Conclusion. In patients with chronic and recurrent low back pain, MCE seem to be superior to several other treatments. More studies are, however, needed to investigate what subgroups of patients experiencing LBP respond best to MCE.

Key words: exercise therapy, low back pain, motor control, multifidus, rehabilitation, stability exercise, transversus. **Spine 2013;38:E350–E358**

Low back pain (LBP) is one of the most common pain complaints, with a lifetime prevalence of between 60% and 80%.[1] Despite this, the etiology of LBP remains largely unknown and the majority of cases do not receive a specific diagnosis, giving rise to the term "nonspecific LBP."[1,2] One proposed mechanism in the development of LBP is that spinal instability causes injury to structures with embedded mechanoreceptors.[3,4] Panjabi[3,5] hypothesized that spinal stability depends on 3 systems: the passive articular system, an active muscular system, and a neural control system. Bergmark[6] divided the muscular system into a local system, which fine controls intervertebral motion, and a global system, which generates spinal motion. Muscles that have been argued to play a major role in spinal stability are primarily the transversus abdominis (TrA) and the multifidus, but also the pelvic floor and the diaphragm.[6–10] Recent research has proposed that the activity of the TrA is associated with postural demand in standing.[11] In individuals with LBP, the local

Ulf Marnitz www.ruecken-zentrum.de

Probleme

- Einheitliche Definition der Begrifflichkeiten
- Ein- und Ausschlusskriterien
- Suchstrategien
- Studienbewertung (SIGN 50 vs. Oxford)

Zusammenfassung

- aktuelle internationale Forschungsaktivitäten
- Moderate Evidenz für ISG, hohe für LWS
- Signifikanter Zusammenhang segmentale Instabilität und cLBP

Ausblick

- Fortsetzung systematische Literaturanalyse
- Erstellung von

1. systematischen Reviews
2. Metaanalysen

- Leitlinienentwicklung über die „Leitlinienkommission der DGOOC“ und deren Aktivitäten zum Thema „Spezifischer Rückenschmerz“

(Appell von Prof. Dr. Kladny, DKOU 2013)

Rückenzentrum
DIAGNOSTIK • THERAPIE • PRÄVENTION

Dezember 2013

Vielen Dank für Ihre Aufmerksamkeit

UKH
Universitätsklinikum
Halle (Saale)

Ulf Marnitz

Melvin Mohokum

Joachim Mallwitz

Anke Steinmetz