Shoulder management in Overhead Athletes

Rob Tamminga

CV

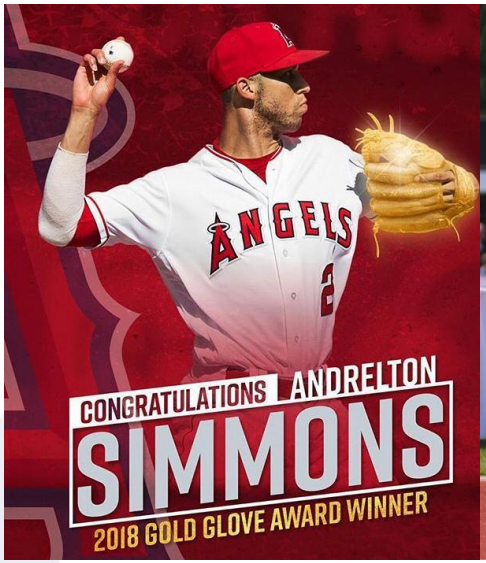
- Topsport-physiotherapist FysioHolland-Medicort
- Head Physiotherapist AZ Alkmaar
- High Performance Partner Team NL
- Topsport combi-poli with dr. H. van der Hoeven, Bergmankliniek Naarden
- Consulent high athletes

MEDICORT Sports & Orthopedic Care

Discussion

Strategy in physical examination of the Overhead Athlete Shoulder

Strategy in treatment of the Overhead Athlete Shoulder



MEDICORT
Sports & Orthopedic Care

Sport Injuries Related to Shoulder (% of Total Injuries)

Mechanisms and Treatments for Shoulder Injuries in Overhead Throwing Athletes *ACSM 2017*

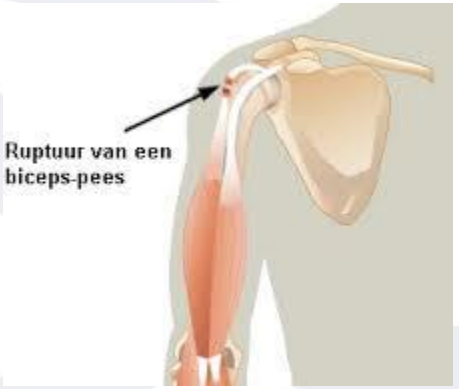
- Baseball (pitchers and position players) 58% to 69%
- Softball (pitchers and position players) 14% to 25%
- Cricket (bowlers) 12.5% to 41%
- Handball 7% to 40%
- Volleyball 8% to 60% , 33% to 53% due to overuse
- Football (quarterbacks) 15% , 2.1% due to overuse
- *Tennis >10% (Aspetar 2017)*

- *The most common alterations: kinetic chain dysfunction, scapular dyskinesis and GIRD*
- *The most common surgery: RC repair, Capsule shift, Labrum / SLAP repair*

Type of Shoulder Surgery

- Artroscopic:

- Subacromial decompression / Bursectomy
- Labrum repair
- SLAP repair
- Biceps tenodese / tenotomy
- Capsule shift
- Cuff repair
- Latarjet
- Combination of several type's of surgery



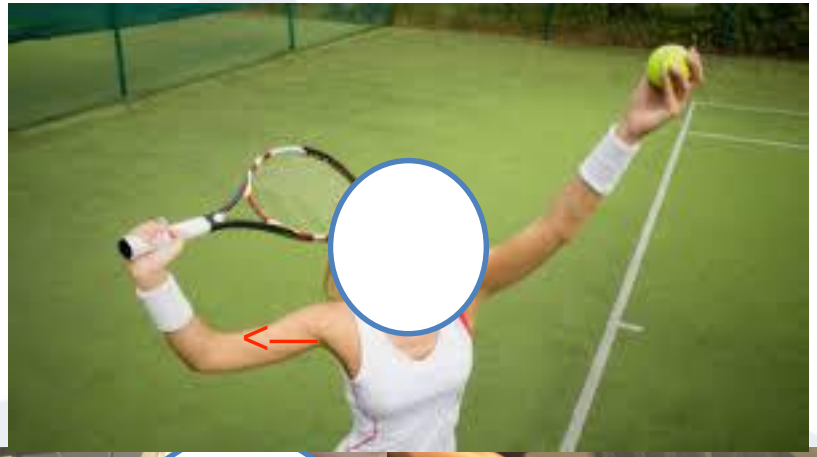
Dr. H. van der Hoeven, 2012

Strategy in physical examination of the Overhead Athlete Shoulder

- Anamnese: trauma / overuse
- Kinetic Chain
- Scapula function / Shouldercapsule
- ROM: CTO / ER-IR in 90dgr abduction
- Opposite hip function
- Role of Myofascia
- Shouldertest including Ultrasound
- Stanmore Triangle
- Mobilise the CTO joint first?

MEDICORT
Sports & Orthopedic Care

Trauma / Overuse

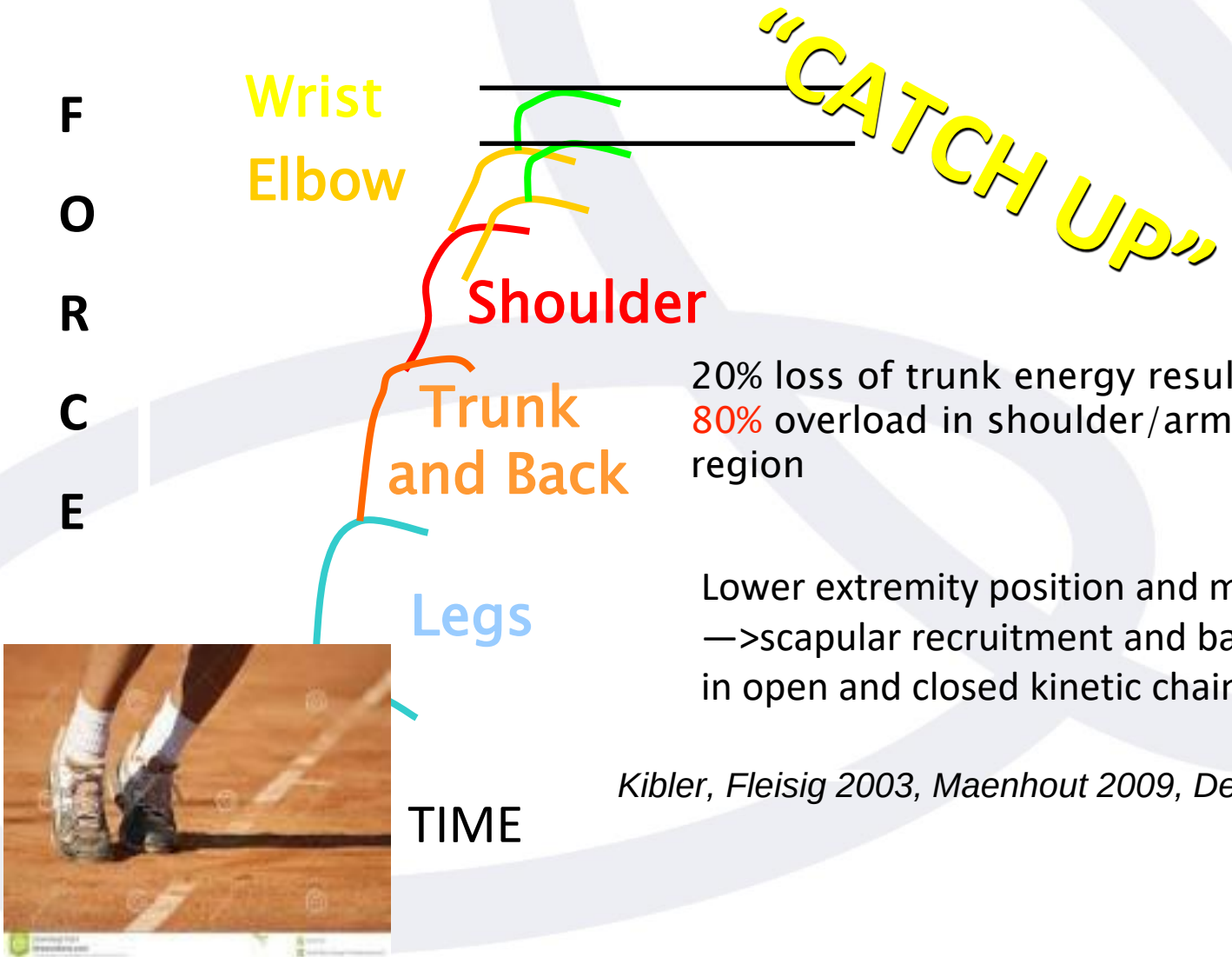


MEDICORT
Sports & Orthopedic Care

Kibler
Changing view in management of the Overhead Shoulder

W. Ben Kibler The Role of the Scapula in Athletic Shoulder Function
Am J Sports Medicine 26: 325 – 337 (1998)

Kinetic Chain



20% loss of trunk energy results in 34%–80% overload in shoulder/arm region

Lower extremity position and movement —>scapular recruitment and balance ratio's in open and closed kinetic chain exercises

Kibler, Fleisig 2003, Maenhout 2009, De Mey 2012

Kinetic Chain Common Faults

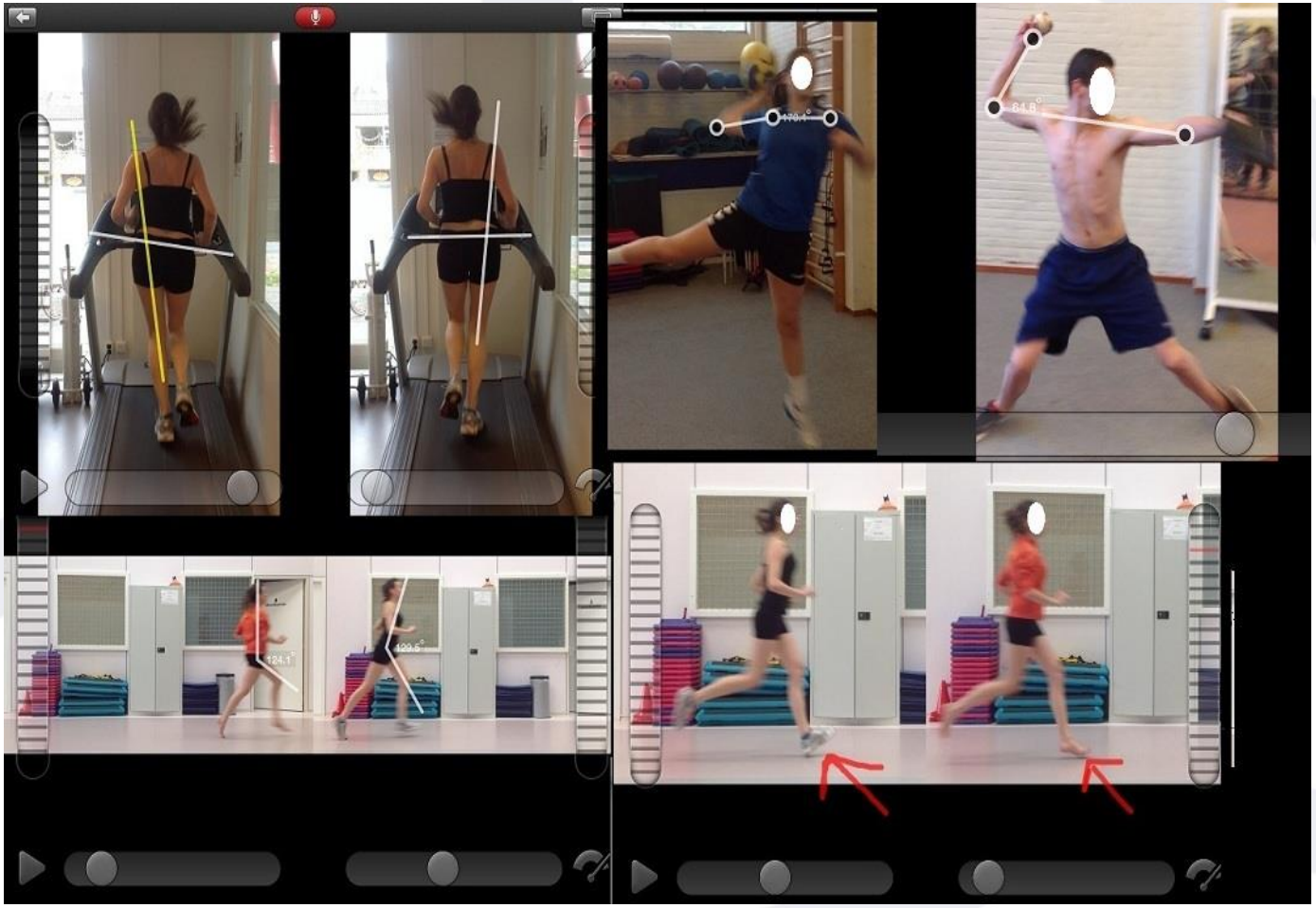
Corkscrewing
Bowing

Opposite Hip Drop

Forward Lean

Burkhart, Kibler Artroscopy 2003

Kinetic Chain analyses?



Trunk and Back

Weak hip-trunk-back muscles

Scapula Lateral Slide Test

Static position:

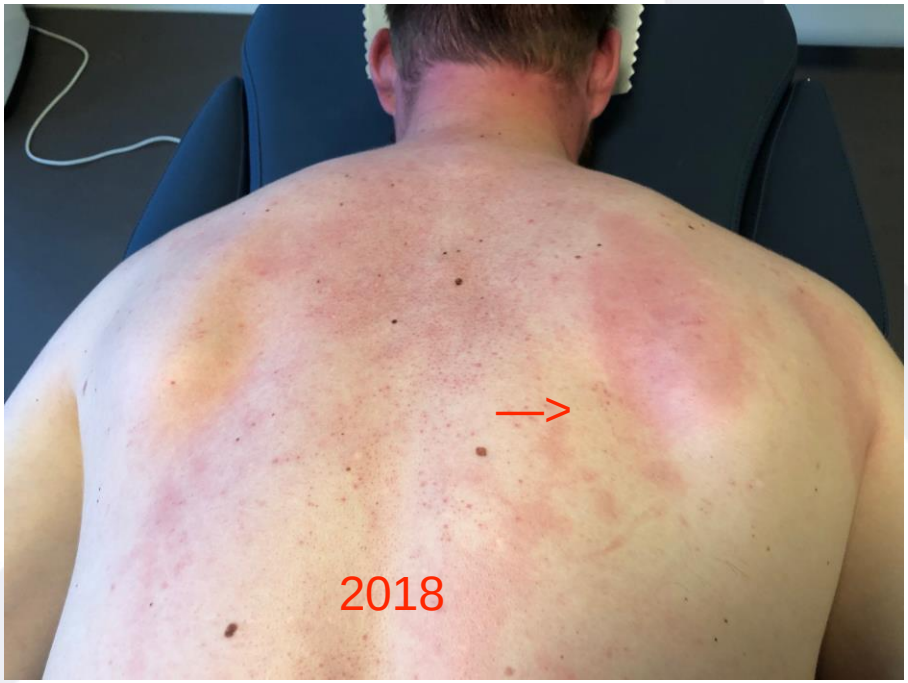
> 1.5 cm difference L /R	Position	I	less active muscle activity
Test-retest 0.84 – 0.88	Position	II	serratus / trapezius lower level
Intertester 0.77 – 0.85	Position	III	trapezius / serratus/ rhomb. 40%

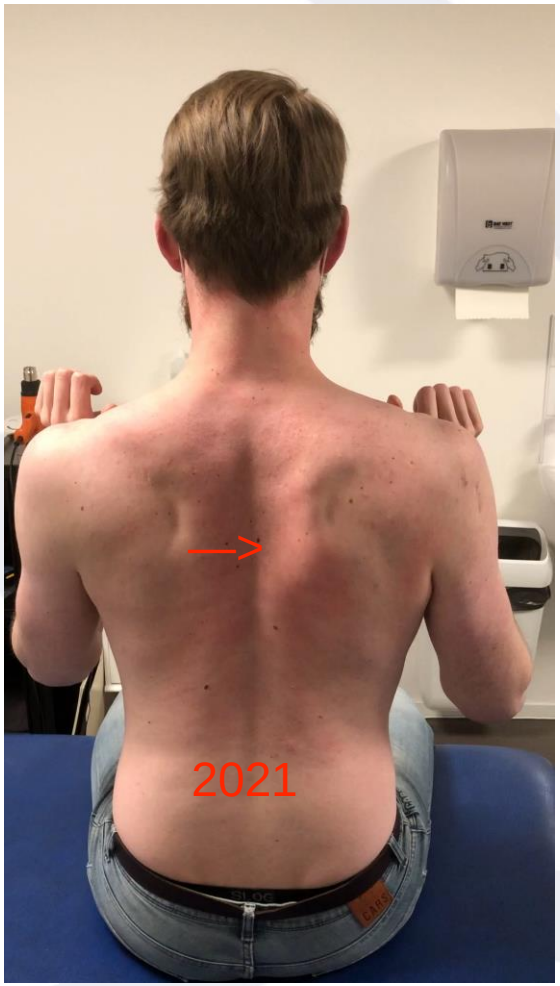
- Type 1-3 Dyskinesia

- Dynamic position:
  1 Anterior tilt Tipping ang. inferior
  2 Margo med. Winging
  3 Ang. Superior Shrugging

Kibler, 2000 Lexinton Sports Medicine

Scapula diskinesis





Rehab takes time!!!

SAT TESTING

SCAPULAR ASSISTANCE TEST

Assist elevation

Stabilize / Rotate inf-med. border scapula

Relief of impingement signs !!

SCAPULAR RETRACTION TEST

Stabilize / retract medial scapular body

Increase rotator cuff strength

Decrease internal impingement

—>Increased Subacromial Space

Kibler 1993, Rabin 2006, Eubanks 2011

Project Fastball (2016-2019)

- *Dutch Newspaper and television about baseball injuries:*

"Honkbal. Een blessuregevoelige sport. In september 2016 kopte de Volkskrant nog dat pitchen in het honkbal de meest gewelddadige beweging in de sport is, waardoor geen pitcher verschoond blijft van elleboog- en/of schouderblessures. En onlangs (25 januari 2017) besteedde Nieuwsuur nog een item aan Project FASTBALL van de TU Delft, VU Amsterdam en diverse partners waaronder de KNBSB, Medicort; Specialisten in Fysiotherapie en Manual Fysion. In dit project wordt onderzocht hoe Nederlandse pitchers blessurevrij harder kunnen werpen. Is training van invloed op (preventie van) blessures?"

- *Conclusion:*

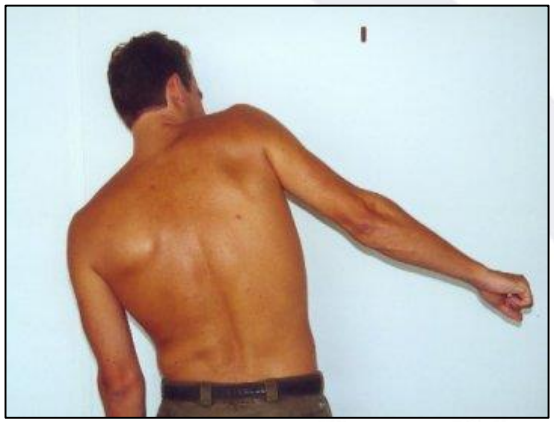
  Speed of pitching is negative related with restricted opposite Hip function and / or restricted rotation of the Spine

Opposite Hip

MEDICORT
Sports & Orthopedic Care

Shoulder Range of Motion

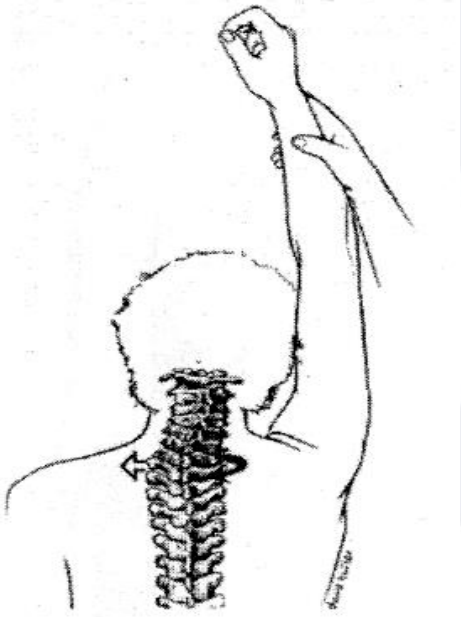
- GH restriction: Abduction < 90 degrees



Red Flag!!!

- Painful Arc: Use SAT / SRT!!!

- CTO mobility: Rotation / Lateroflexion / Extension
  C4-T4: examination 3D homoside extension

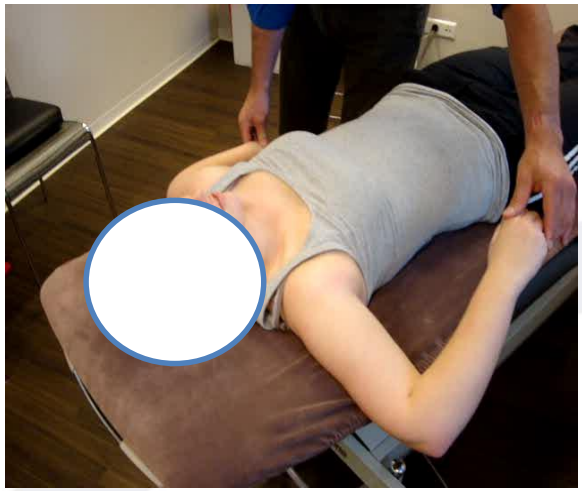


Strunce, Walker, Boyles, & Young 2009

Restriction CTO —> Restriction in GH / ST

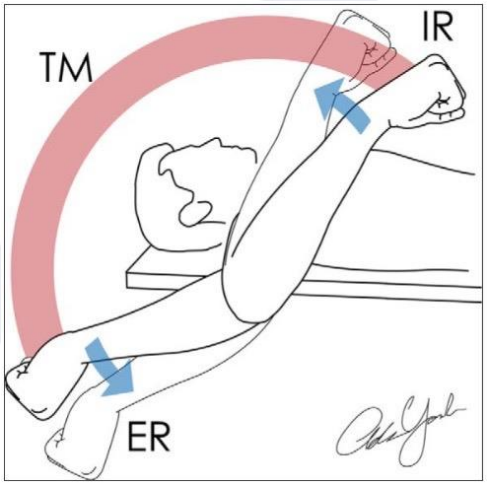
Ellenbecker position

Overhead Athlete need >100 Degrees ER
Normal side difference 20% IR
TROM 10% side difference



GIRD = 30 degrees!

Overhead Athlete:
Normal adaptation in ER / IR



ER + IR = TM >180 Degrees

Cools 2008
Shane T. Seroyer, Sports Health 2009
Ellenbecker, Med Sci Sports Exercise 2002
Ellenbecker, Rome Congres Throwing Motion 2012

Ellenbecker position

Elite Javelin thrower

Elite volleyball player

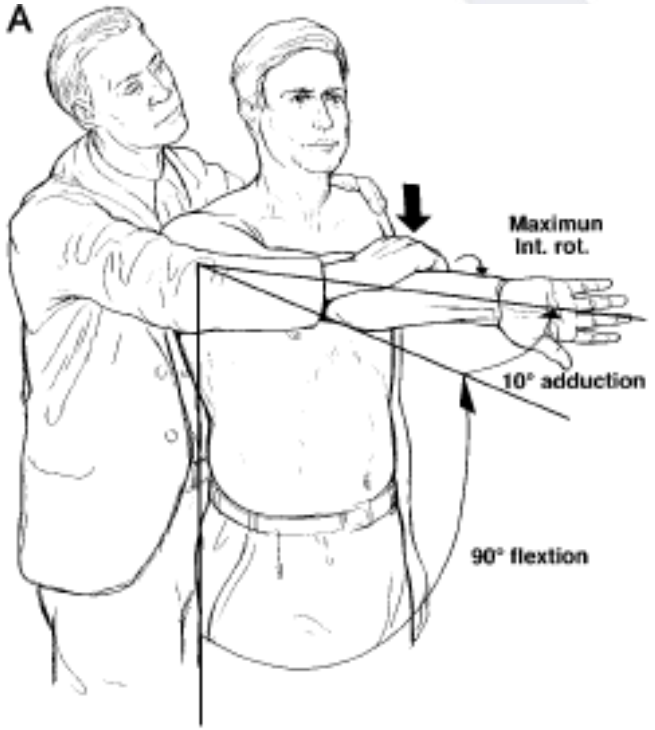
Pozzi 2020

MEDICORT
Sports & Orthopedic Care

Shoulder-test

Physical Examination Tests for the Shoulder Complex

Index of Tests



M.Moen 2010

MEDICORT Sport Medisch Centrum

Management of Shoulder test in Overhead Sport (OS)

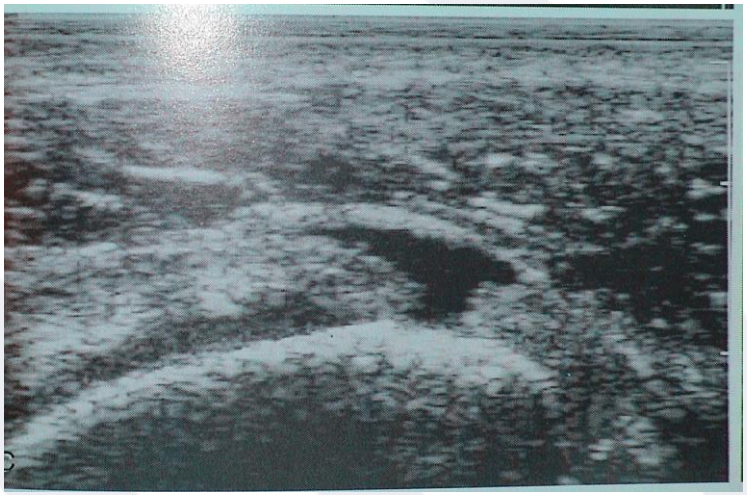
» Using one shoulder test is no test
» Test in the good position both sides
» Learn to test in the same order
» Use SAT / SRT in impingement testing
» “Golden” stability test = Relocation
» “Golden” AC-joint test = AC pinpoint
» Learn to recognize several injury pattern
» Follow testing with Ultra-sound imaging
» Note: combination of injuries in OS

MEDICORT
Sports & Orthopedic Care

UltraSound imaging

An orthopedic surgeon's guide, Chantal Plomb-Holmes et al Els. 2018

What to expect in clinical examination?
PA +
GH abd limited / Scapula dyskinesia
ER 0 Degrees R +/-
Jobe ++ pain and weakness
Hawkins +
O'brien +/-
SAT / SRT +
Yocum -
Lift of -
Speed -
Stability test -
AC pinpoint -

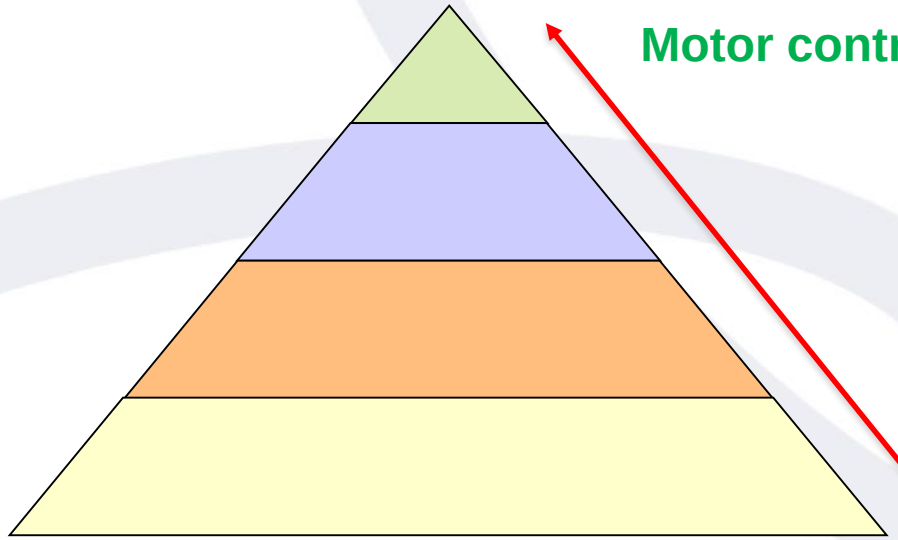


Partial SSP lesion

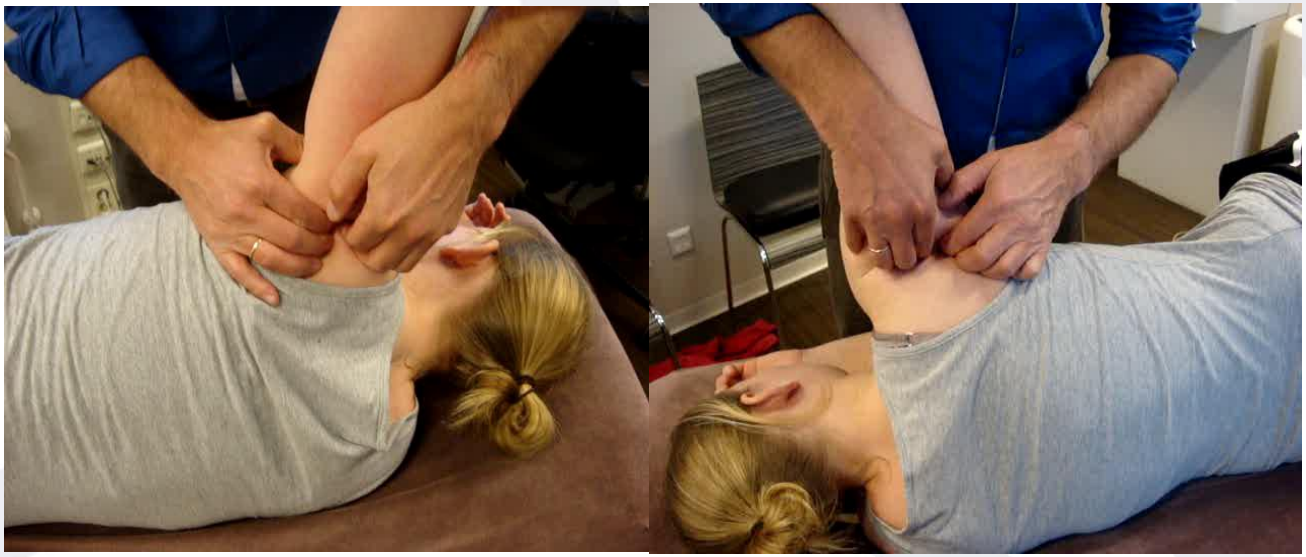
Better result if clinical shoulder examination and ultra-sound is in the same hand!

Clinical guideline MDI

“ Ian Bayley” Stanmore Triangle



Motorcontrol



SOROF: A. Jaggi 2008

Several authors Kibler 2003, Arzi 2013, Radwan 2014, Cools 2020,

FAD

- Primary acute anterior shoulder dislocation is a common orthopaedic injury, with an incidence rate of 1.7% in the general population.1,2 Recurrence rate, pain, and inability to participate in sports activities are the most common reasons for concern.
  Although limited, the available evidence from randomized controlled trials (RCTS) supports primary surgery in young adults engaged in highly demanding sports or job activities. There is lack of evidence to determine whether surgical or nonsurgical treatment is better for other categories of injury. *Longo 2014*

- Background: Conservative treatment of posttraumatic anteroinferior shoulder instability leads to a high failure rate in a young and active population. However, treatment in an adolescent age group is not well documented. Methods: The rehabilitation protocol was the same for both groups. All patients were followed up prospectively after 12, 24, and 36 months using Rowe Score. *Gigis 2014*

- From Duth Orthopedic View the Consensus is: FAD is not a primary surgery approach

MEDICORT
Sports & Orthopedic Care

SINEX Program TASD

(SHOULDER INSTABILITY EXERCISE) *Henrik Eshoj et al 2017-2020*

- *Background:*

  Risk of recurrent dislocations

  Operative treatment is superior above conservative treatment

  Risk of complications after surgery

  No proper specific exercise program was published (post-op/cons)

  Based on biomechanical and neuromuscular training principles – (from lower limb studies)

- *Study design:* Randomised, assessor-blinded, controlled, multicentre trial

  SINEX:

  Individually Program seven exercises: scapular setting and control, glenohumeral setting and control during internal and external rotation, co-contraction of glenohumeral muscles, dynamic glenohumeral stability, training of glenohumeral proprioception.

- Control:

  Individual supervised program

Shoulder Instability Exercise Program, *Henrik Ode Eshoj 2017-2020*

SINEX Program TASD

(SHOULDER INSTABILITY EXERCISE) *Henrik Eshoj et al 2017-2020*

- 12 WKS PROGRAM

SINEX:

Individually program seven exercises:

Type: scapular setting and control, glenohumeral setting and control during internal and external rotation, co-contraction of glenohumeral muscles, dynamic glenohumeral stability, training of glenohumeral proprioception

From Basic 2x20-25 reps 7x/wk to Elite 2x10-12 reps 3x/wk

Control:

Individual home based supervised program 3x/wk 2x 10reps

Type: Abd / IR / ER / Scaption

From isometric to dynamic

Result:

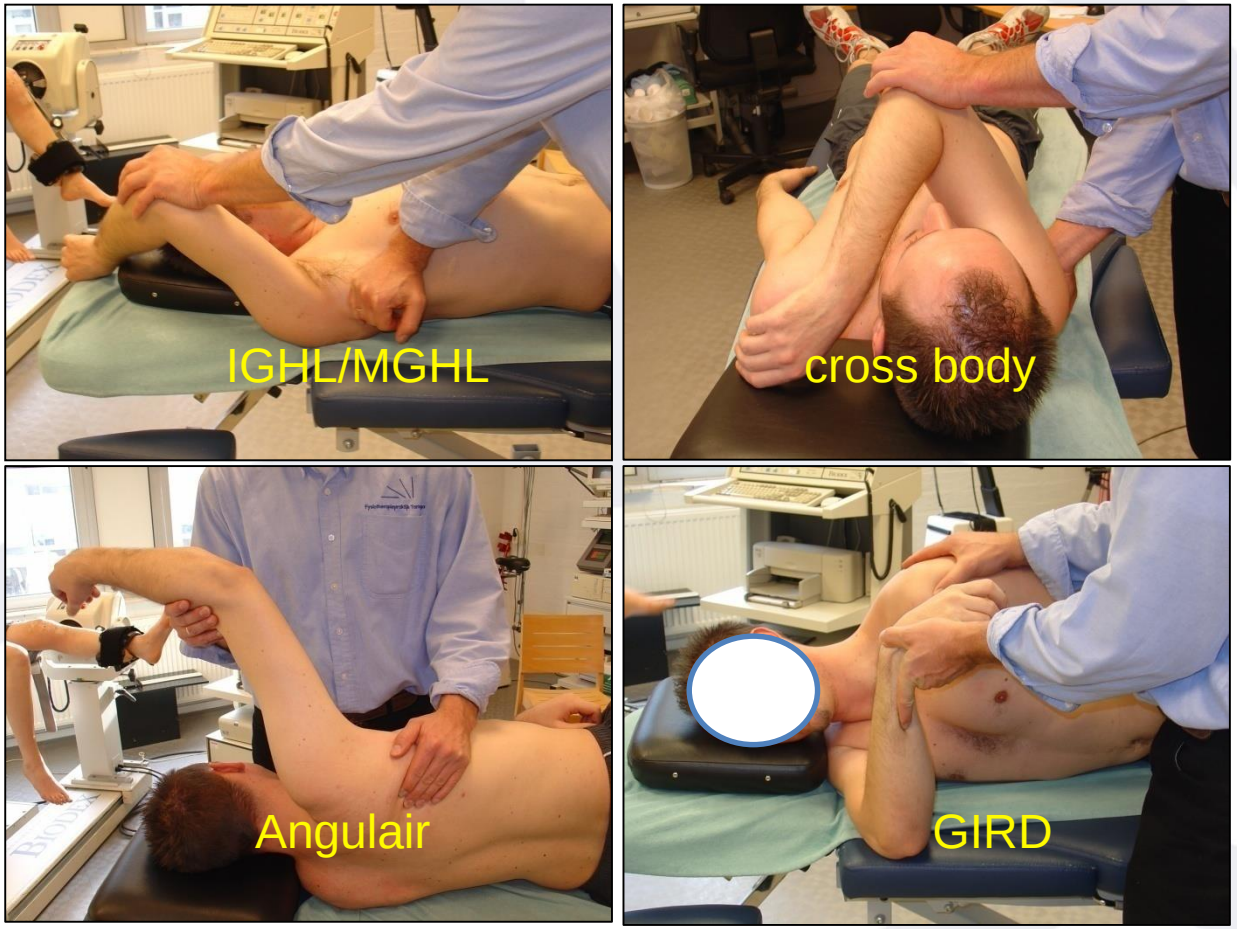
No difference after 12 wks on short term, long term significant improvement in RASD

SLAP lesion

- “Nonsurgical treatment for SLAP lesions in professional baseball players can result in a high rate of return to previous performance,” Wasyk W. Fedoriw, MD, said at the American Orthopaedic Society for Sports Medicine Annual Meeting 2012 here. [*Wasyk W. Fedoriw, MD] Wasyk W. Fedoriw*
- 45 Pitchers / 23 PP
- RTP Pitchers NonS 87% / **65%** – S 46% / **12%**
- RTP PP NonS 100% / **75%** - S 71% / **35%**

- **2021**
- Surgery procedure is necessary when rehab of a specialist shoulder PT failed. When pain is the main factor there will be consider a tenodesis or tenotomy of the biceps longum tendon.

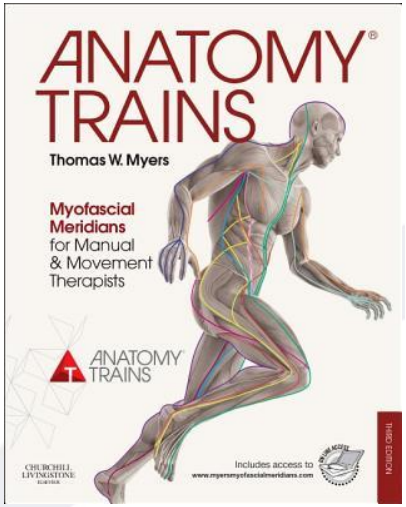
Examination Shoulder Capsule

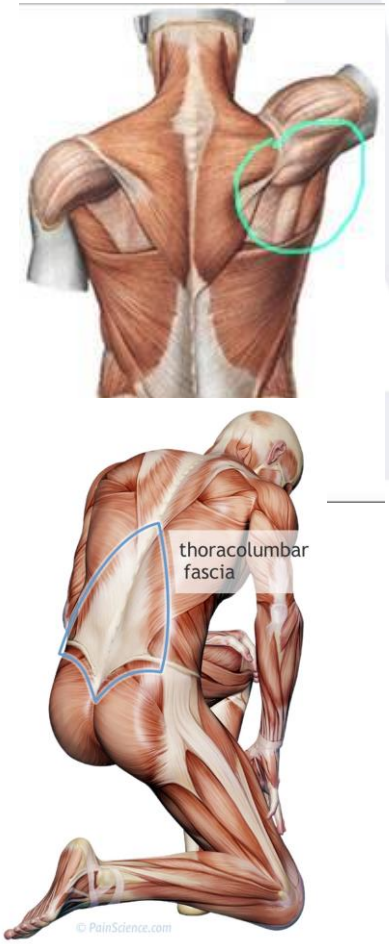


Harryman 1990, JBJS / McClure 2007, JOSPT no3
Ellenbecker 2012

Myofascial Approach

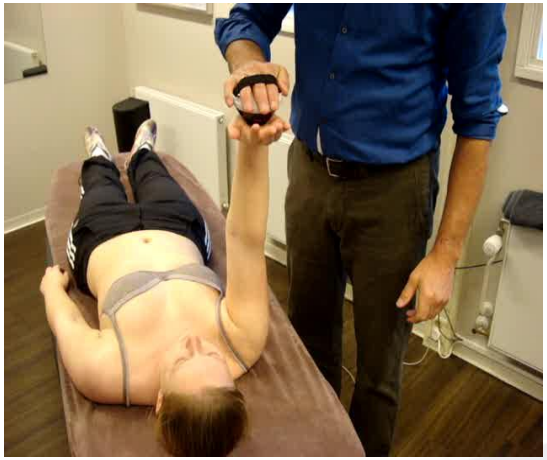
-



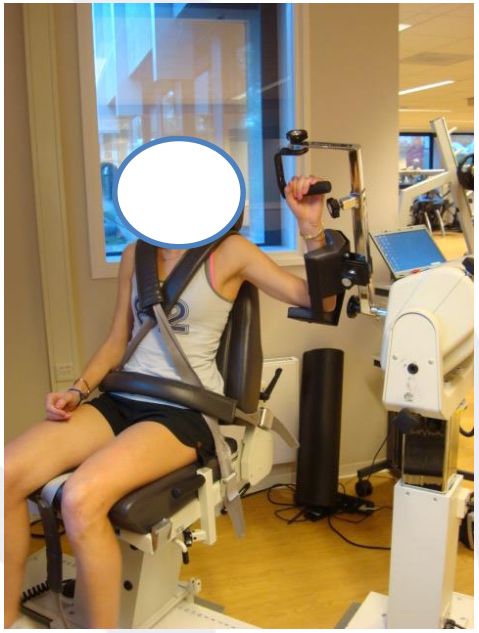


Thomas Myers 2018

Strength test



Isometric:
BCP-TCP-ER-IR
SA-DELT-TA-TT

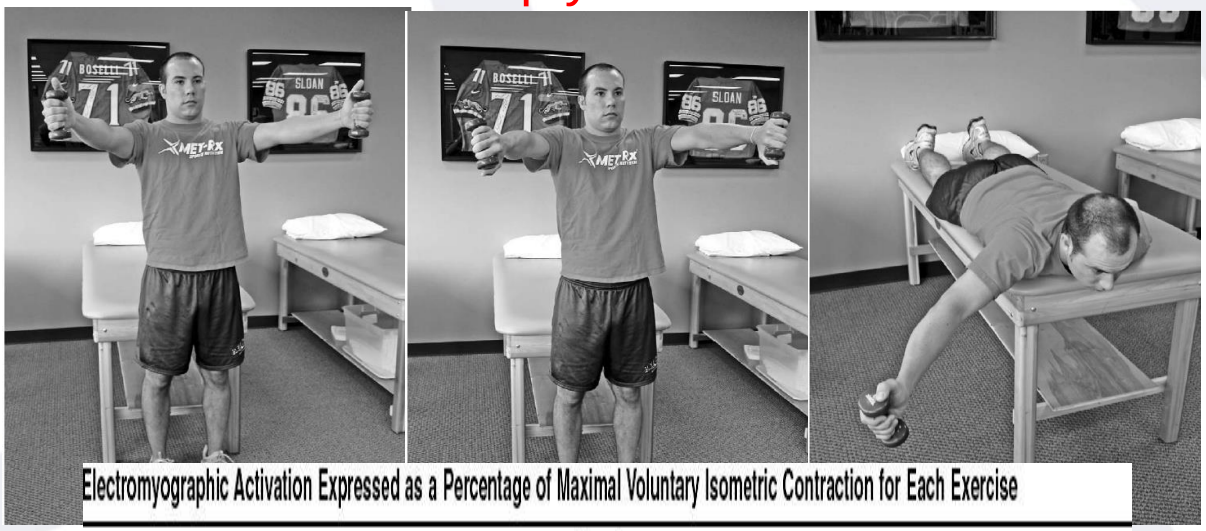


Isokinetic: conc/conc
IR:ER RATIO=10:7
Dvirr 2000

(Byram et al. AJSM 2010)
(Ellenbecker & Cools 2010)

Electromyographic Analysis of the Supraspinatus and Deltoid Muscles

- Full Can Empty Can Prone Full Can



Electromyographic Activation Expressed as a Percentage of Maximal Voluntary Isometric Contraction for Each Exercise

	Exercise						
	Full Can		Empty Can		Prone Full Can		*P* Value for Repeated-Measures Analysis of Variance
Muscle	Mean ± SD	Range	Mean ± SD	Range	Mean ± SD	Range	
Supraspinatus	62 ± 40	44–80	63 ± 45	44–83	67 ± 50	44–89	.807
Middle deltoid	52 ± 27	39–65	77 ± 44	55–99	63 ± 31	48–79	.029*
Posterior deltoid	38 ± 32	23–53	54 ± 28	41–67	87 ± 53	62–111	.001*

Boston Red Sox Journal of Athletic Training 2007

Strategy in treatment of the Overhead Athlete Shoulder

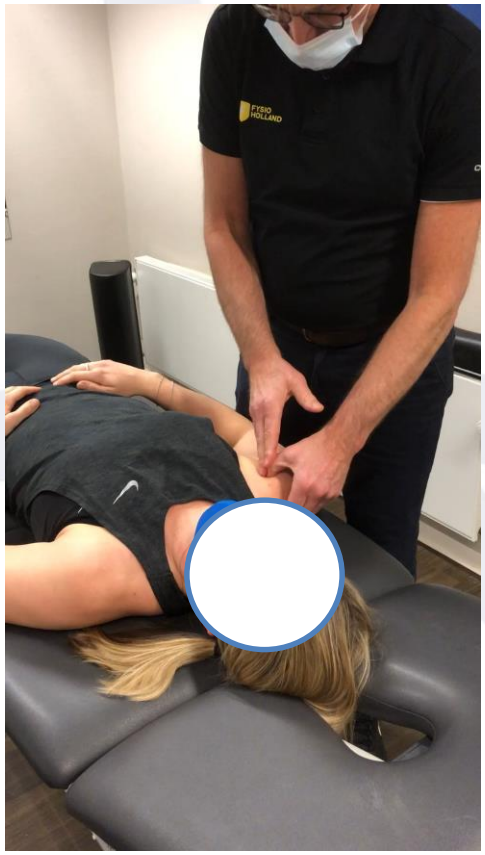
- Basic: Individual Program and accent is always hands on!!!!!
- Check during mobilization the ER/IR in 90d Abd
- Mobilisation:
  CTO region
  Opposite Hip incl. Fasciae technique Front Lane
  Lower extremities if necessary
  Scapula in back/side/prone position, incl. Fasciae technique lig. Thor.Lumb.
- GIRD / capsule stretching
- Daily Home exercises

MEDICORT
Sports & Orthopedic Care

Opposite Hip

MEDICORT
Sports & Orthopedic Care

Friction of m. Pectoralis

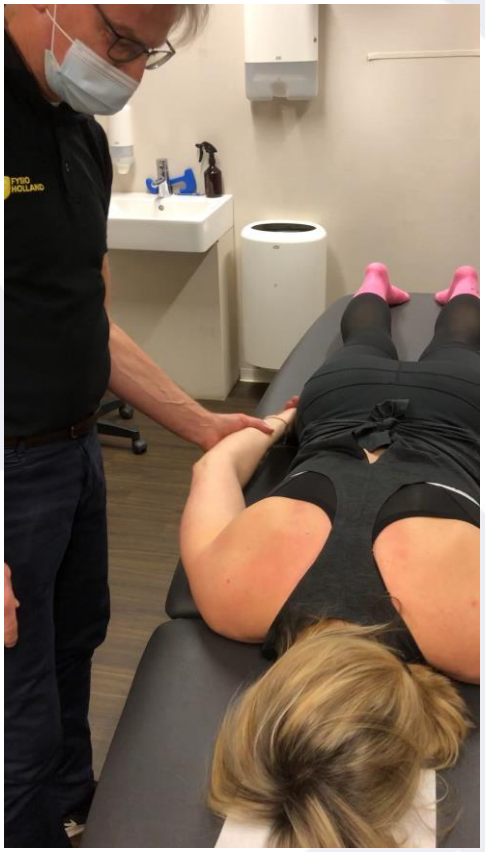


MEDICORT
Sports & Orthopedic Care

Mobilisation Scapulo-thoracic

MEDICORT
Sports & Orthopedic Care

Mobilisation Scap and GH



MEDICORT
Sports & Orthopedic Care

GIRD management

GIRD 90 degrees

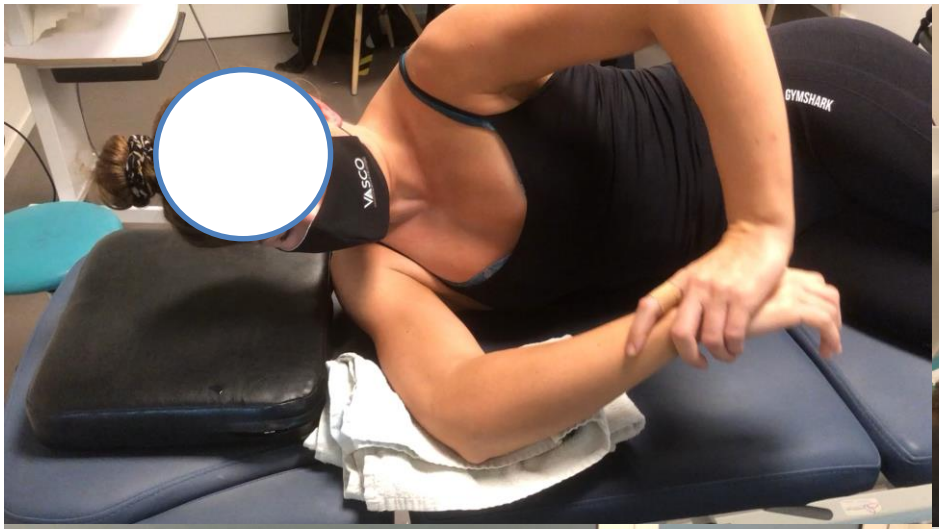
Todd Ellenbecker

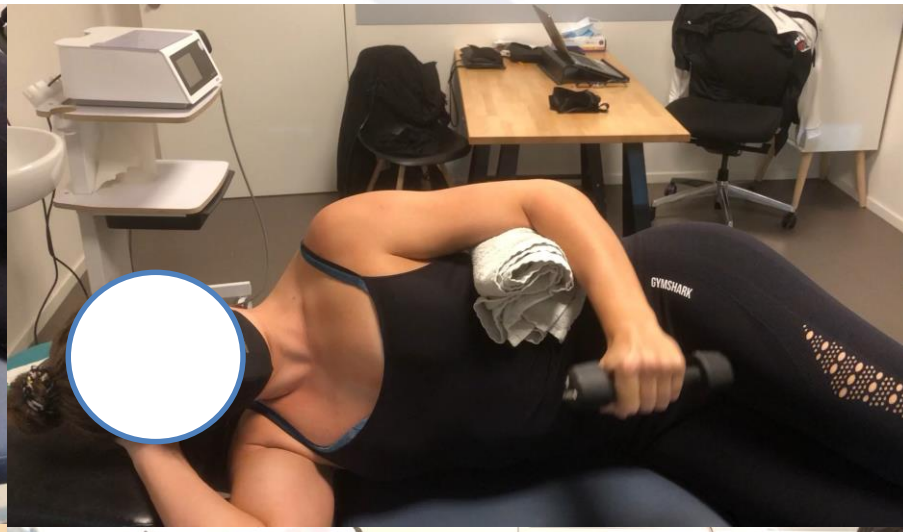
Pumping method with Hold Relax, avoid Impingement!!!

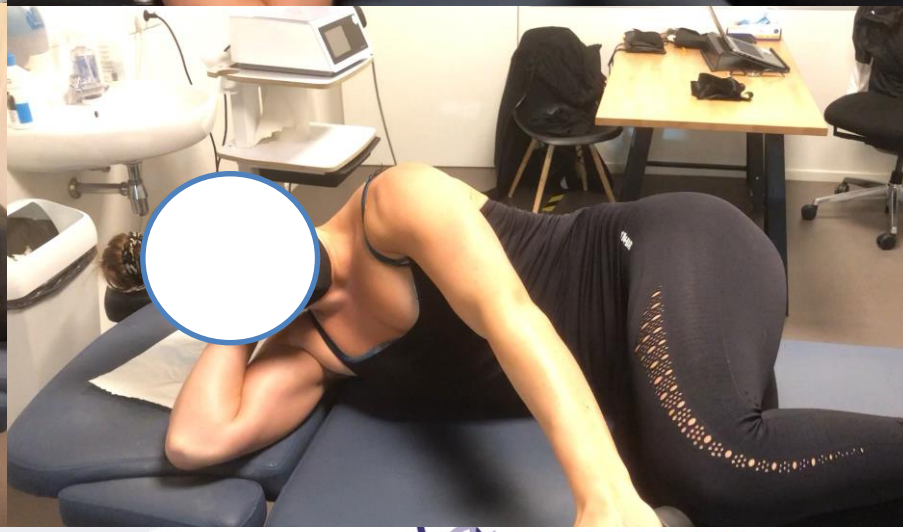
Stretching improves ROM , and increases the subacromial space in overhead athletes with GIRD (Maenhout 2012)

(Manske 2010) (Mc Clure 2005) (Tyler 2010)
(Ellenbecker 2012) (Harryman 1990, JBJS / McClure 2007, JOSPT no3)

Home exercises

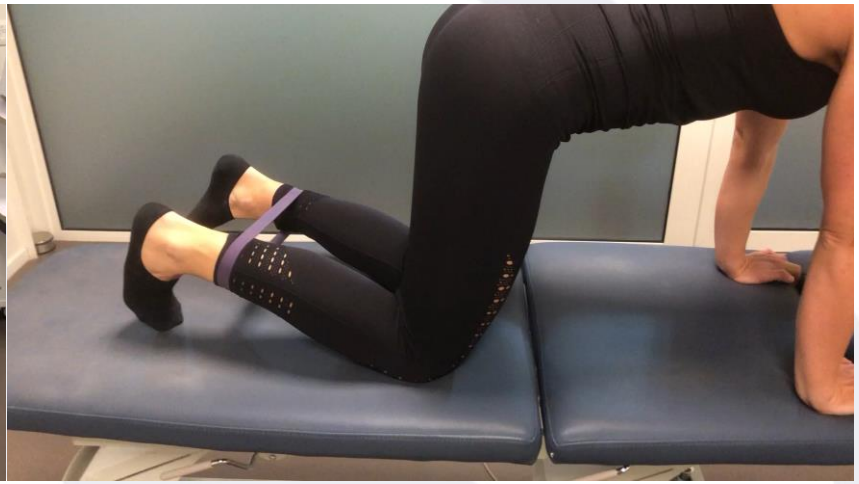


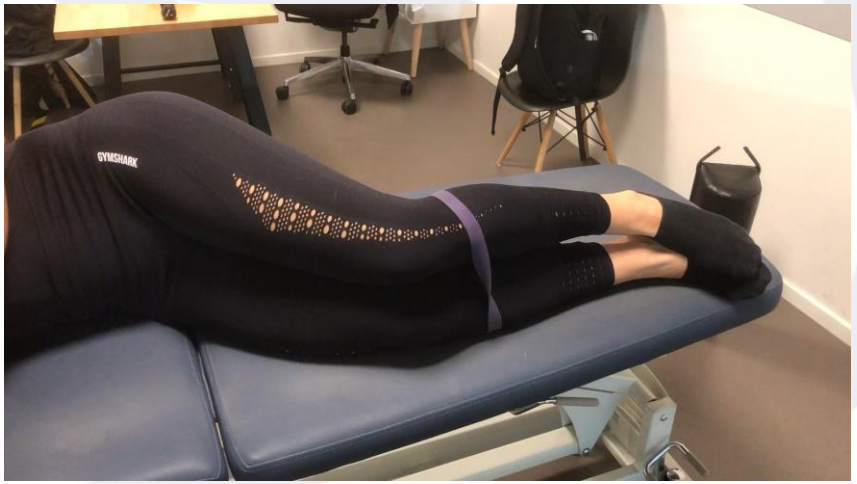




MEDICORT
Sports & Orthopedic Care

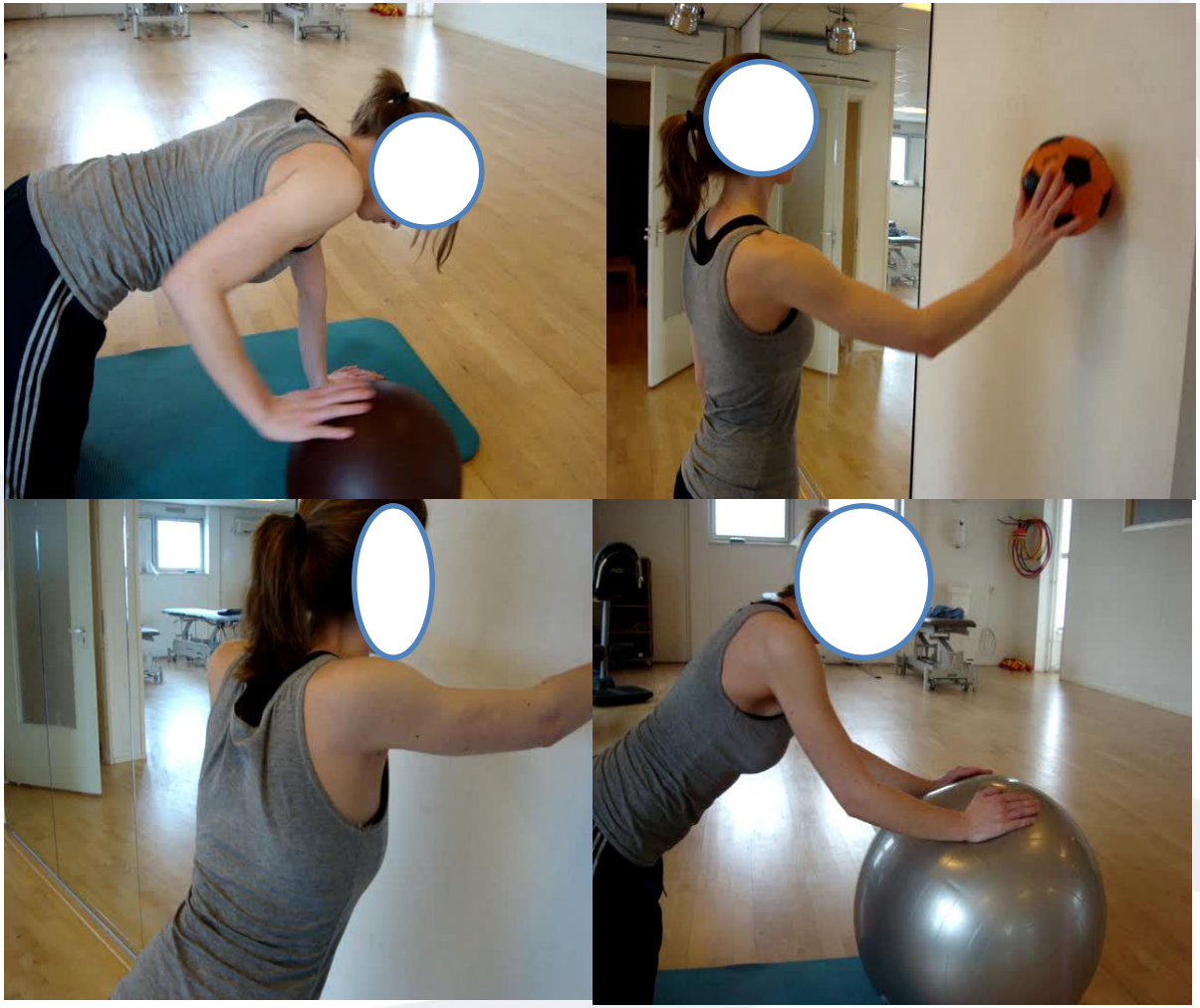
Home exercises



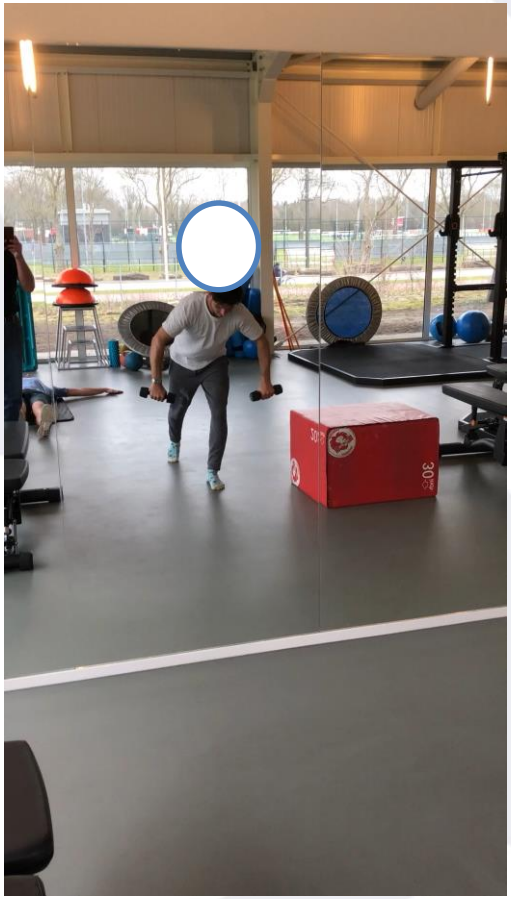


MEDICORT
Sports & Orthopedic Care

Phase: Scap setting exercises
Closed chain

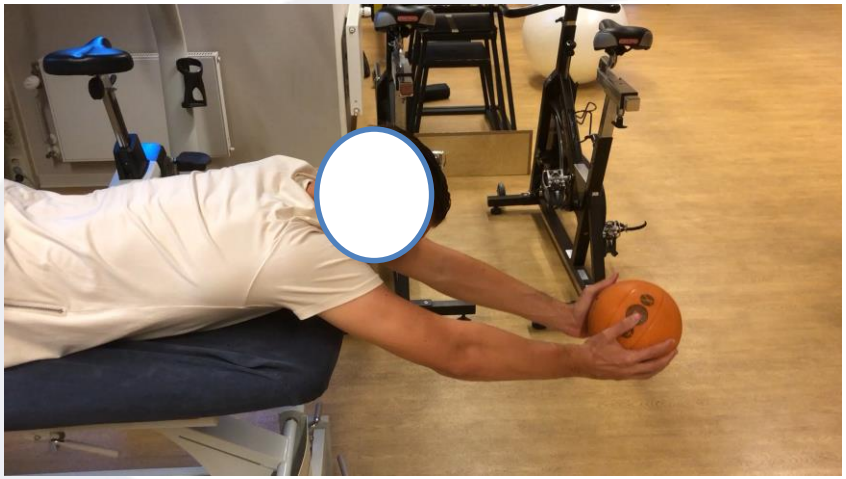


Phase: Kinetic Chain exercises
Open Chain



MEDICORT
Sports & Orthopedic Care

Phase: Active mobilisation



MEDICORT
Sports & Orthopedic Care

Time table individual rehab

- Start basic program 4-6(?) weeks
- Improvement:
  Progress with strength training, scap stabilisation and active mobilisation
  Re-test after 6-8 weeks
  Adjustment on home program
  Improvement:
  Start plyometrics and sport specific exercise
  Re-test after 12-18 wks
  Adjustment on home program
  Check RTP criteria
- No Improvent:
  pain / restriction Shoulder joint is main issue—> injection, after test incl. US exam
  Re-test after 6-8 wks
  No improvement: surgery

MEDICORT
Sports & Orthopedic Care

Take home message: RTP Criteria

- Little or no pain / Near normal ROM and strength
- Normal shoulder function / Normal functional ability
- Normal sport-specific skills Mccarthy et al 2004

- Side difference max. 20% IR in ROM / 10% in TROM
- 10% more strength on dominant side
- ER / IR = 6,6 : 10
- Scap strength: TA and TT equal on both side
- Preventive stretch of GIRD
- Individual home exercises program: mobilisation / stretching / strength

Cools 2010 -2012 -2020

MEDICORT
Sports & Orthopedic Care

However?
The Challenge of the Sporting shoulder

» Highlights:
1 preventing injuries
2 providing evidenced based practice rehabilitation
3 guide the athlete toward RTP

» Nothing seems like it is!!!

Ann Cools et al, 2020

MEDICORT
Sports & Orthopedic Care

Shoulder function on a high level bring sportsman / woman on a high level

Thank you for your attention!!!

https://www.youtube.com/watch?v=APmzoYoxNl4