



P. Lubiowski , P. Kaczmarek, E. Lisiewicz, P. Cisowski, M.  
Grygorowicz,

W. Dudziński, L. Romanowski

# **Shoulder rotational profile and occurrence of rotation deficits among professional handball players and non-athlete population**

*Rehasport Clinic*

*Department of Traumatology, Orthopaedics and Hand Surgery,  
University of Medical Sciences in Poznan*



- to compare the shoulder rotational parameters among professional handball players and non-athlete population
- to assess the occurrence rotational deficits and gains among the populations



# Material

## HB Group

87 professional male handball players

4 Super League (first polish division) teams and 1 team from the 1st League (the second polish division)

no fresh or current disabling shoulder injury or overuse

## Control Group

41 healthy male volunteers

age 20-30

no history of shoulder injury, surgery, pain and or dysfunction,

no history of professional sport participation

	HB group	Control group	significance
Age (y)	25 ± 5 (18-38)	25 ± 1 (20-24)	ns
Hight (cm)	188 ± 6 (175-202)	181 ± 5 (174-189)	p< 0,0001
Weight (kg)	92 ± 11 (64-125)	81 kg ± 5 (61-105)	P<0,001
dominance	R 68 / L 19	R 38 / L 3	ns



# Methods

## GH Rotation

- Patient is lying supine
- Shoulder is abducted to 90° in the plane of the body
- Scapula is stabilized (pressed against the table with simultaneous palpation of coracoid process)
- Visual control



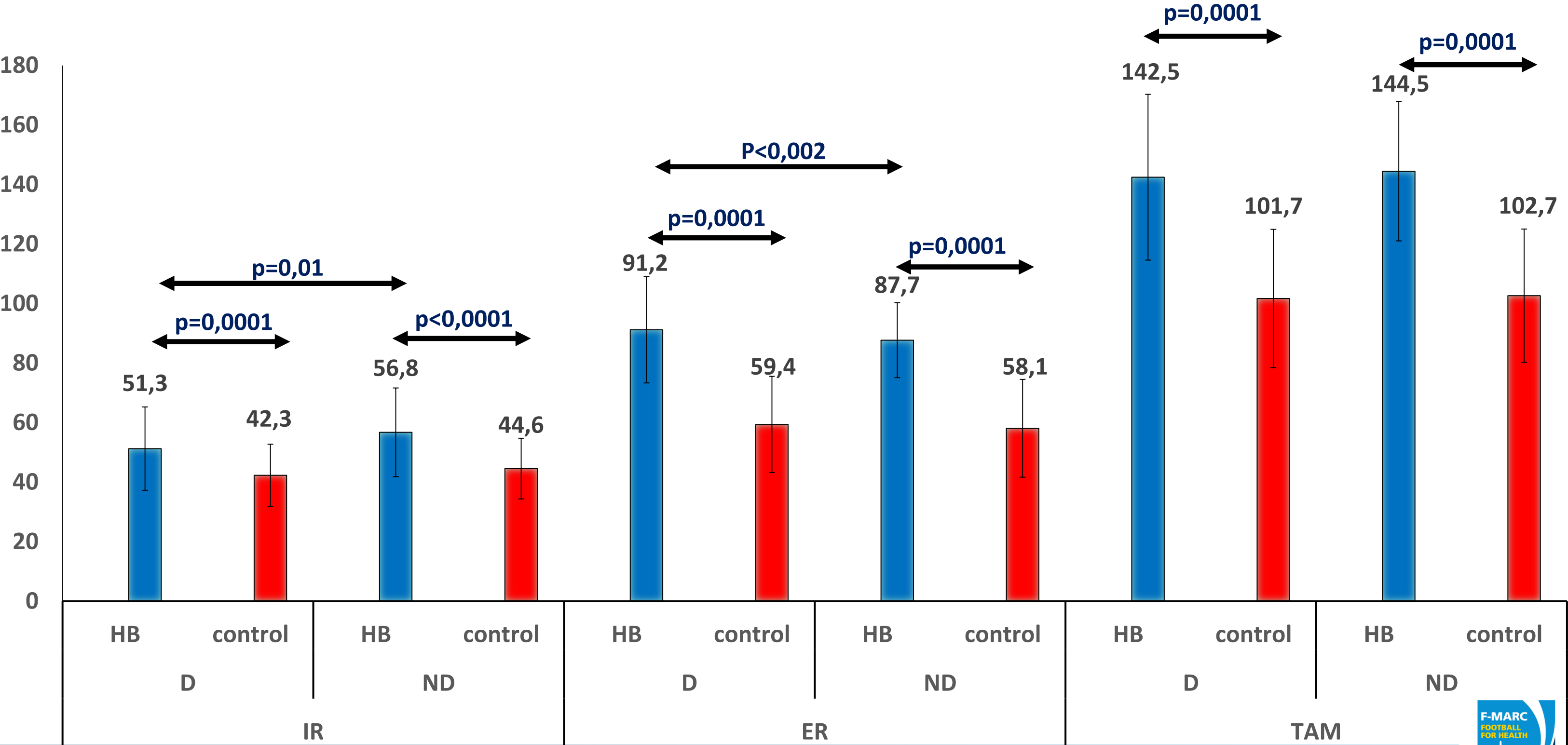
# Methods

## Calculations

- **IR** (internal rotation)
- **ER** (external rotation)
- **GIRD**= non-dom. IR – dom. IR (GH internal deficit)
- **TAM**= IR + ER (total arch of motion)
- **TAMD**= non-dom. TAM – dom. TAM (total arch of motion deficit)
- **ERG**= dom. ER – non-dom. ER (external rotation gain)
- **TAMG**= dom TAM – non-dom TAM (total arch of motion gain)

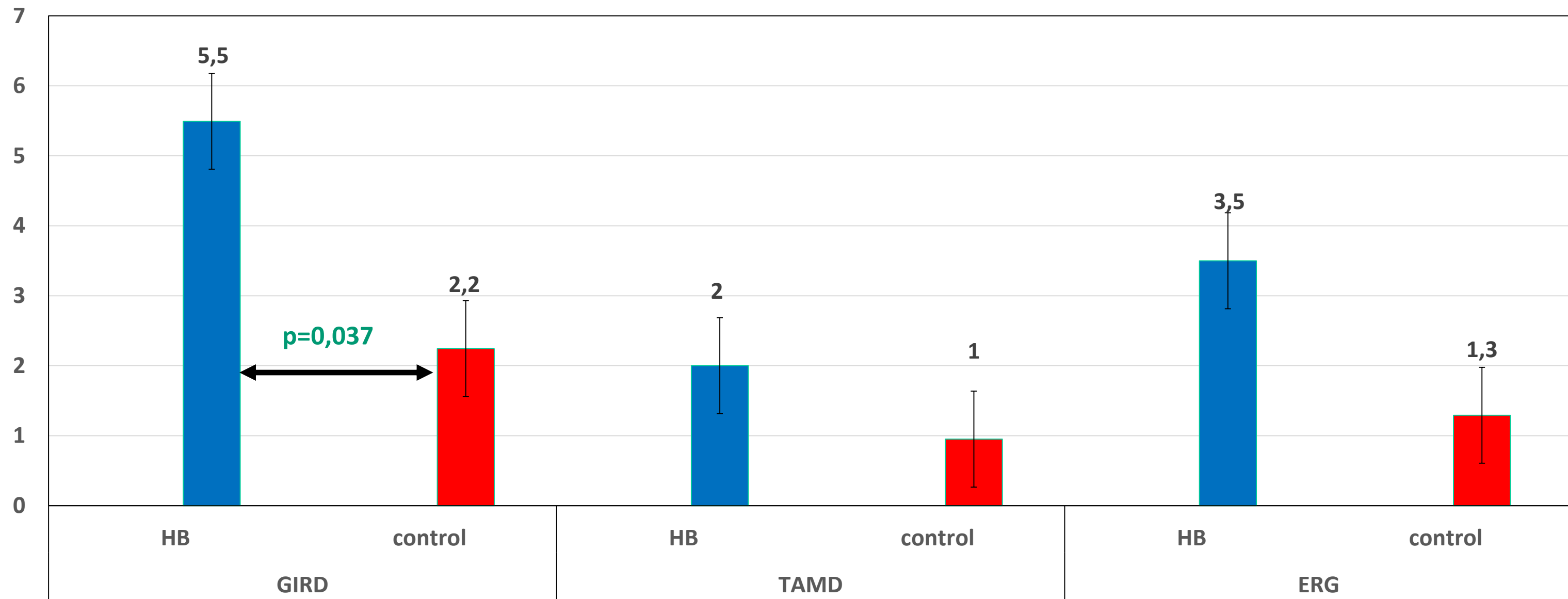
**Statistics:** power, normality, T-student, Mann-Whitney, Fisher's exact test

# Results (rotational profile)



GH rotation and GIRD

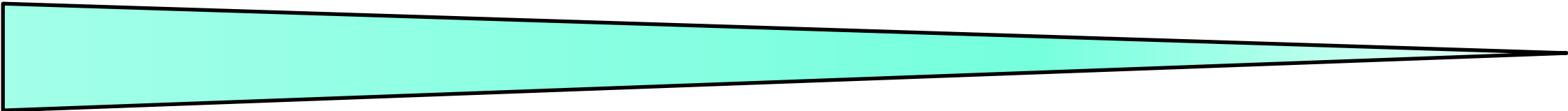
Rotational profile





Incidence of GIRD and ERG

	GIRD (any)	GIRD (>5°)	GIRD (>10°)	GIRD (>20°)	GIRD (>25°)	ERG
Handall players	61% (n=53)	54% (n=47)	37% (n=32)	13% (n=11)	2% (n=2)	39% (n=34)
Control group	51% (n=21)	39% (n=16)	24% (n=10)	2% (n=1)	0% (n=0)	39% (n=16)



No difference Hb vs Control

GH rotation and GIRD

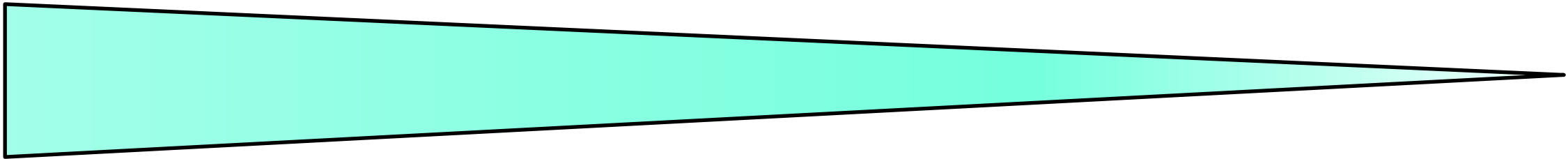
# Results

## Incidence of TAMD and TAMG

	TAMD (any)	TAMD (>5°)	TAMD (>10°)	TAMD (>20°)	TAMD (>25°)	TAMG
Handall players	52% (n=45)	40% (n=35)	24% (n=21)	7% (n=6)	6% (n=5)	39% (n=34)
Control group	51% (n=21)	44% (n=18)	20% (n=8)	2% (n=1)	0% (n=0)	39% (n=16)



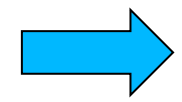
*GH rotation and GIRD*



No difference Hb vs Control

# Discussion

- ➔ Range of rotation in other studies among throwing athletes
- IR- 20°-77°
  - ER- 92° -132°
- 
- higher in baseball
    - 37°- 119° - Nakamizo 2008
    - 34° - 118° - Ruotolo 2006
    - 52° - 132° - Kibler et al. 2013
  - lower in handball
    - 33° - 98° - Almeida 2013
    - 30° - 105° - Clarsen 2014
    - 51° - 91° - our



## Incidence of GIRD

- larger deficit > less frequent (61%- 2%)
- other studies- 5-40%
- Dwelly et al. 2009
  - prefall 21%, prespring 3% and postspring 14%)
- No reports on non-throwing population
  - Our
    - limited ROM
    - No difference GIRD/TAMD occurrence

## GIRD

study	GIRD	sport
Clarsen at al. 2014	4	handball
Torres at al. 2009	3 and 4	Swimming and tennis
Dwelly at al. 2009	4	baseball
Our	5,5	handball
Almeida at al. 2013	6,7 (no pain) vs. 15 (pain)	handball
Shanley at al.	4	Baseball
Ruotolo at al. 2006	9 (pain) vs. 13 (no pain)	Baseball
Wilk at al. 2009	10-13 (different techniques)	Throwing athletes
Nakamura	22	Baseball



# Conclusions

## Handball players

- revealed typical shoulder adaptation with increased ER and decreased IR
- show larger rotational ranges than non-athlete population.

## GIRD and TAMD less frequent with larger deficits

- Clinically important deficits affect 13%-GIRD and 7%- TAMD

Occurrence of rotational deficits although higher in handball players was not significantly different from non-athlete group.



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Thank you

Mulțumesc !

