

Physical examination findings of elbow joints in para athletes participating in Oita International Wheelchair Marathon Race from 2013 to 2015

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Wheelchair marathon

Wheelchair marathon is a kind of wheelchair racing running around 42.195 km of marathon or 21.0975 km of half marathon.



Racing type wheelchair



Hand rim

- There are three wheels in a wheelchair.
- Roll the hand rim with the upper limbs.



Wheelchair marathon

- The wheelchair marathon is a high-speed game.
- The average speed is over 30 km in the top athlete and runs at 42.195 km in 1 hour 20 minutes.
- Because the wheelchair marathon lasts for a long time and high intensity exercise, it places a heavy burden on the upper limbs.



London Paralympic Wheelchair Sports



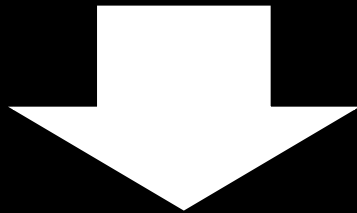
Oita International Wheelchair Marathon race



Introduction

- Athletes for wheelchair sports commonly experience elbow pain.
- If wheelchair athletes have their arms damaged, it is difficult for them to live a normal life.

- Elbow joint injury is one of the risk factors to deteriorate their activities of daily life.



- To investigate elbow joint injury and clinical practice, we studied physical examination in elbow joints for wheelchair athletes.

physical examination



Material

Subjects

- Seventy four Para-athletes
- 72 men and 2 women
- They participated in Oita international wheelchair marathon race from 2013 to 2015

Physical characteristics

Age(years)	49.4 ± 14.6
Body weight(Kg)	59.6 ± 8.8
Body height(cm)	167.0 ± 8.8
Wheelchair marathon histories(years)	16.8 ± 9.9

(mean ± SD)

Medical check items

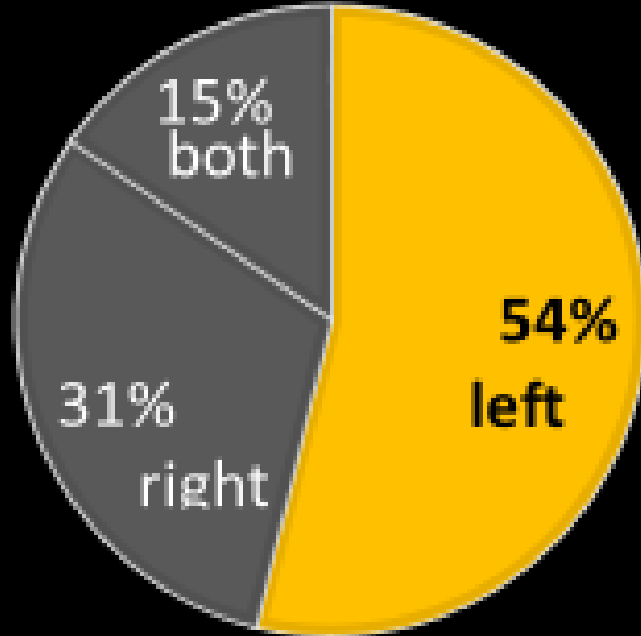
- Medical check items were interview
(complain about motion pain, dominant hand and daily living)
- Motion pain, tenderness, Tinel's sign, ulnar nerve palsy and range of motion on elbow

They were recorded by well trained orthopedist.

Result

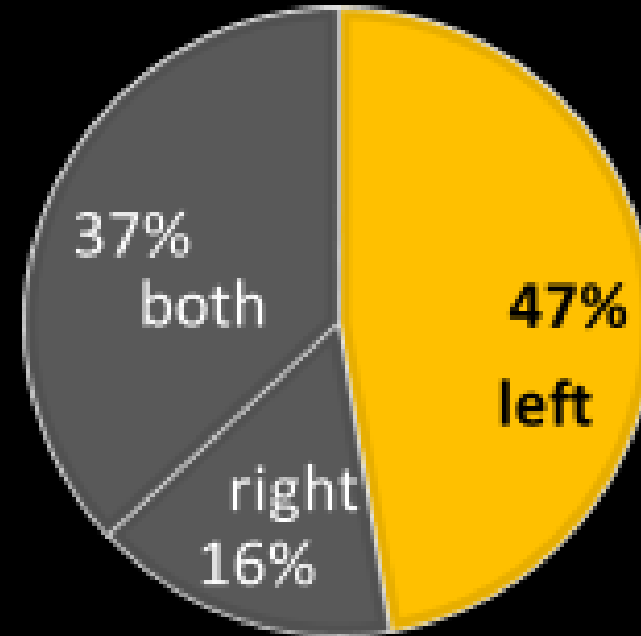
< Motion pain >

13 (about 18%) athletes complained of the motion pain.



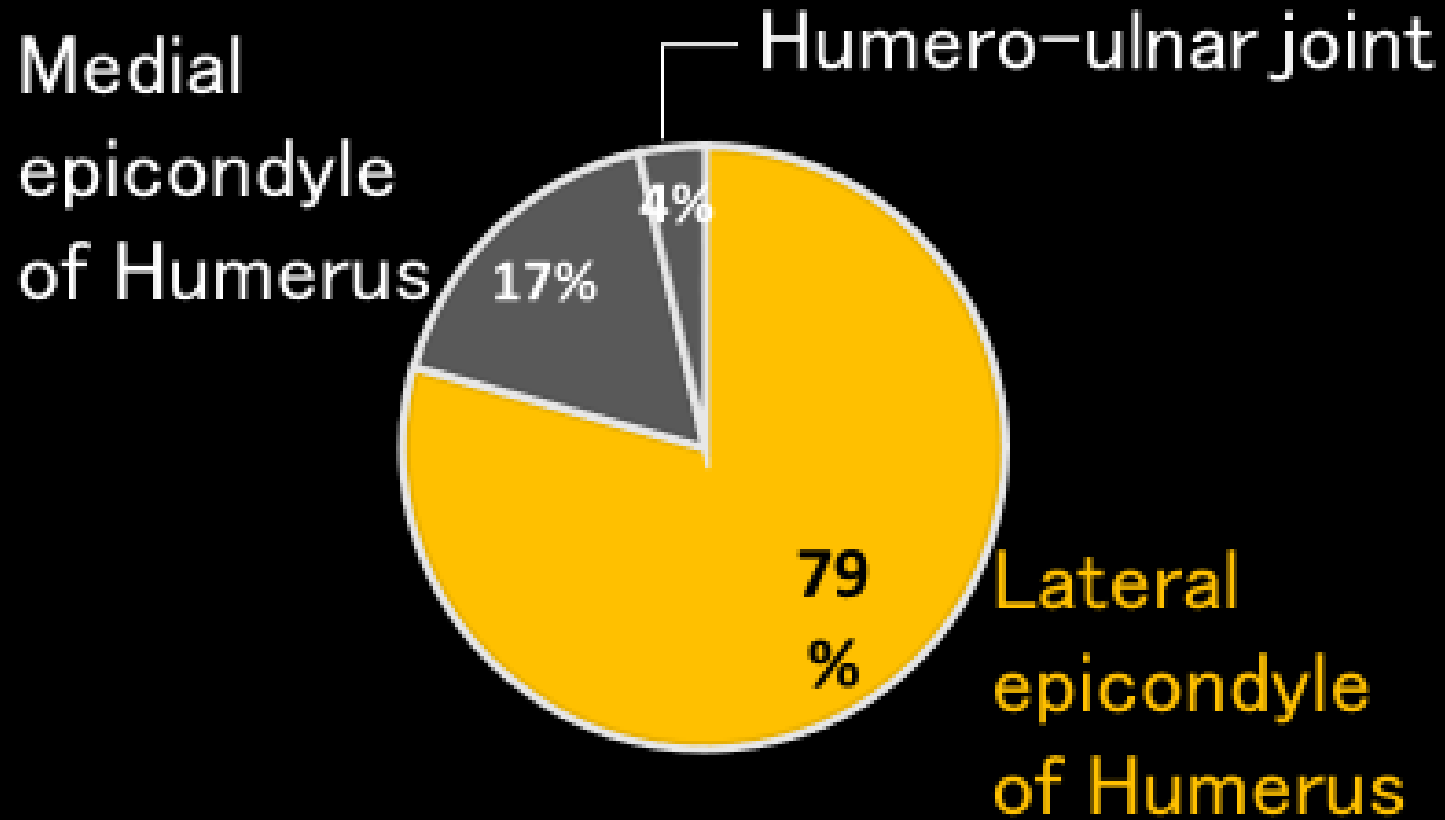
< Tenderness >

19 (about 26%) athletes complained of the tenderness.



Left elbow motion pain and tenderness are significantly frequent compared with right side.

< Resion of tenderness >



Most of tenderness in elbow joints are found in lateral epicondyle.

- The 13 athletes had Tinel's sign in cubital tunnels of six right and seven left side.
- The two athletes had left ulnar nerve palsy.
- In all subjects, ranges of motion in both elbow joints were normal.
- The most athletes have no laterality of hand during transferring or changing the direction of wheelchair in daily life.

Discussion

New findings

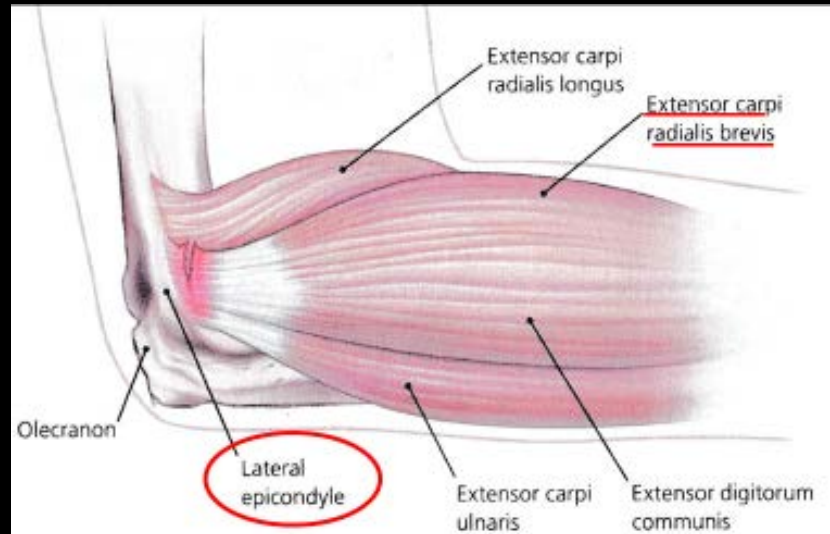
- ① Left elbow motion pain and tenderness are significantly frequent compared with right side.
- ② Most of tenderness in elbow joints are found in lateral epicondyle.

But

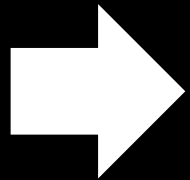
- Dominant hand should be stressed in daily use.
- Thus, daily use did not explain elbow problems in the wheelchair athletes.

lateral epicondylitis

Extensor carpi radialis brevis(ECRB) tendon + repetitive microtrauma



Kraushaar BS, Tendinosis of the elbow(tennis elbow).J bone Joint Surg(1999)

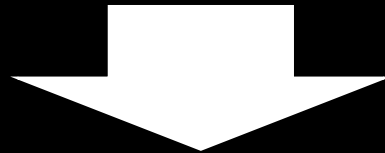


When driving the wheelchair, the wrist joint will be extended and the muscle will be overloaded.

Laterality

Upper limb injuries of elite wheelchair athletes did not appear to be a dominant (right) side of the body.

M.S.Ferrara, Injuries to Elite Wheelchair Athletes. Paraplegia (1990)



Laterality of elbow problems would be occurred in hand-rim propulsion during circling. Left elbows should get greater resistance compared with right.

In past report, factors of lateral epicondylitis related to racquet sports

1, incorrect technique

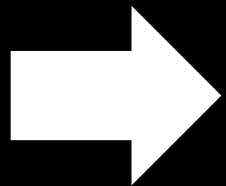
2, extended duration of play

3, frequency of play

4, size of the racquet handle

5, racquet weight

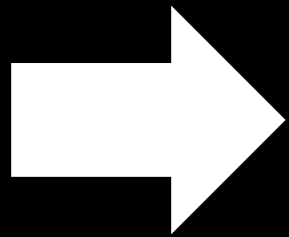
Smidt N, Tennis elbow in primary care. BMJ(2006)



In the wheelchair marathon, 1 and 2 may be involved in the lateral epicondyle.

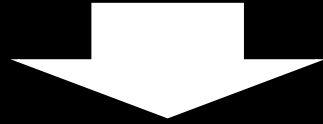
Novice tennis players have more ulnar deviation/flexion during backhand strokes and generate a longer time of eccentric contraction than professional players, and these **awkward postures and unskilled techniques might induce lateral epicondylitis.**

Riek S, A simulation of muscle force and internal kinematics of extensor carpi radialis brevis during backhand tennis stroke. Clin Biomech (1999)



In this study, athlete's awkward postures and unskilled techniques can induce lateral epicondylitis.

- When driving the wheelchair, the wrist joint will be extended and the muscle will be overloaded.



- Some wheelchair players are not better at using the left upper limb than the right side when driving the wheelchair.



- Laterality of elbow problems would be occurred in hand-rim propulsion during circling. Left elbows should get greater resistance compared with right.



- The left upper limb tends to become lateral epicondylitis.

Summary

- Left elbow motion pain and tenderness are significantly frequent compared with right side.
- Most of tenderness in elbow joints are found in lateral epicondyle.
- We suggest that wheelchair athletes had better to take physical examination of elbow to prevent and treat lateral epicondylitis regularly.