The Physical Therapy and Prevention of CAI

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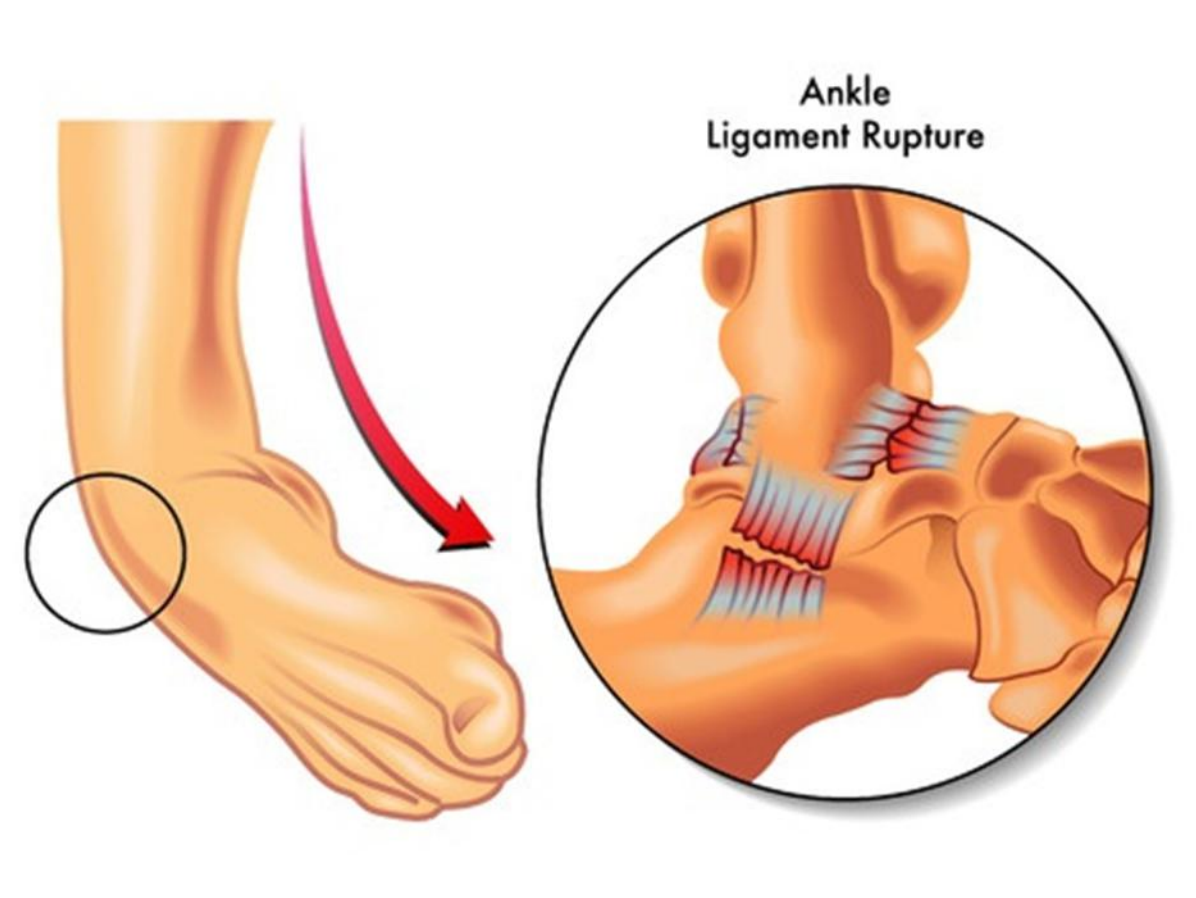
Definition

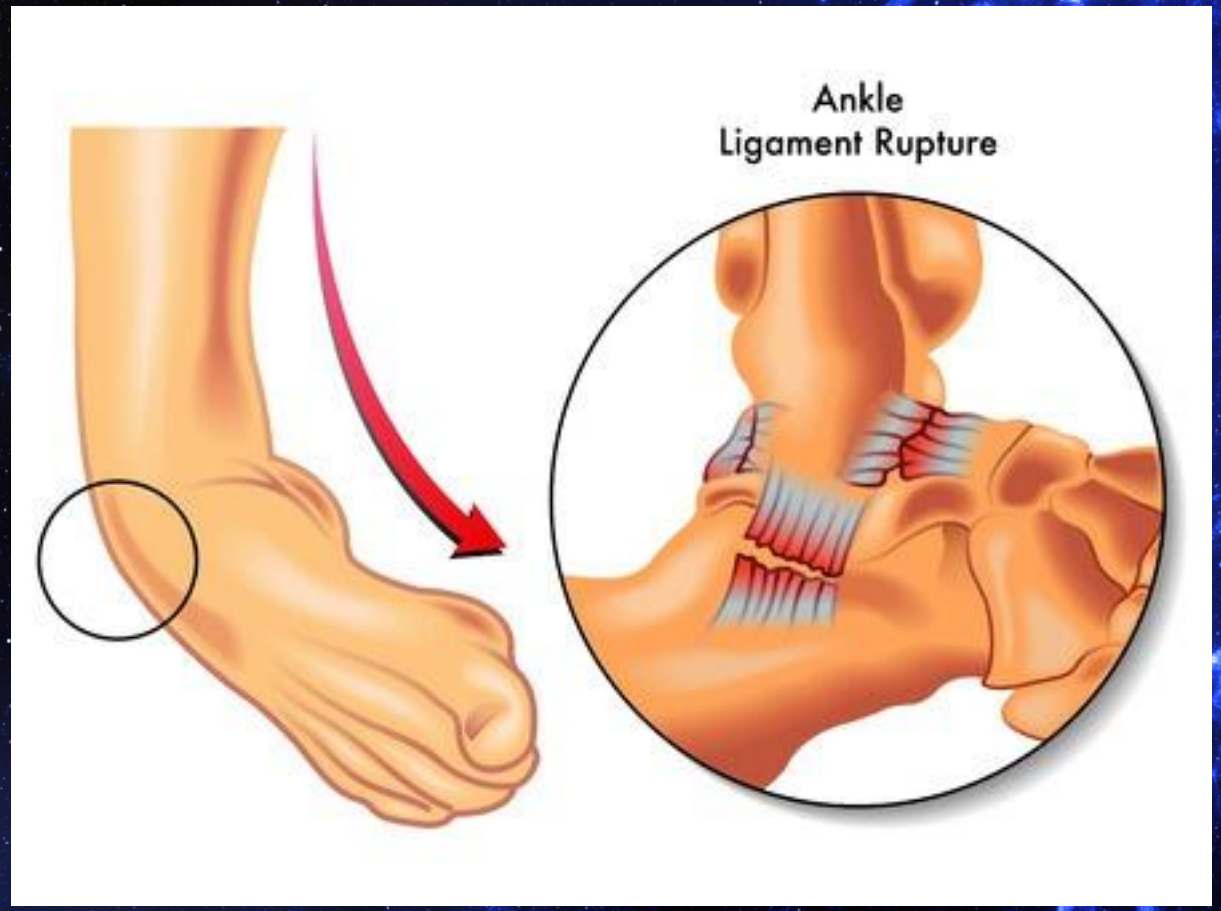
Functional chronic ankle instability（CAI）



***CAI* can be defined as the state caused by the experience of multiple *lateral ankle sprains*, with instability resulting from restricted joint ROM.**

(Chan KW.J,2011)

Lateral ankle sprain



The result of a fast-combined motion of ankle plantarflexion and inversion, with the sprain of the 3 lateral ligaments.

www.primecarephysio.com

(Ryan P McGovern.J,2016)

2

Epidemiology

Epidemiology

The most common athletic injury(41.1%)

Amazing recurrent rate(73%)

(You-jou Hung.J.2015)

3

Anatomy(stabling factors)

Anatomy(stabling factors)

Local stability

Bony structure

Ligaments

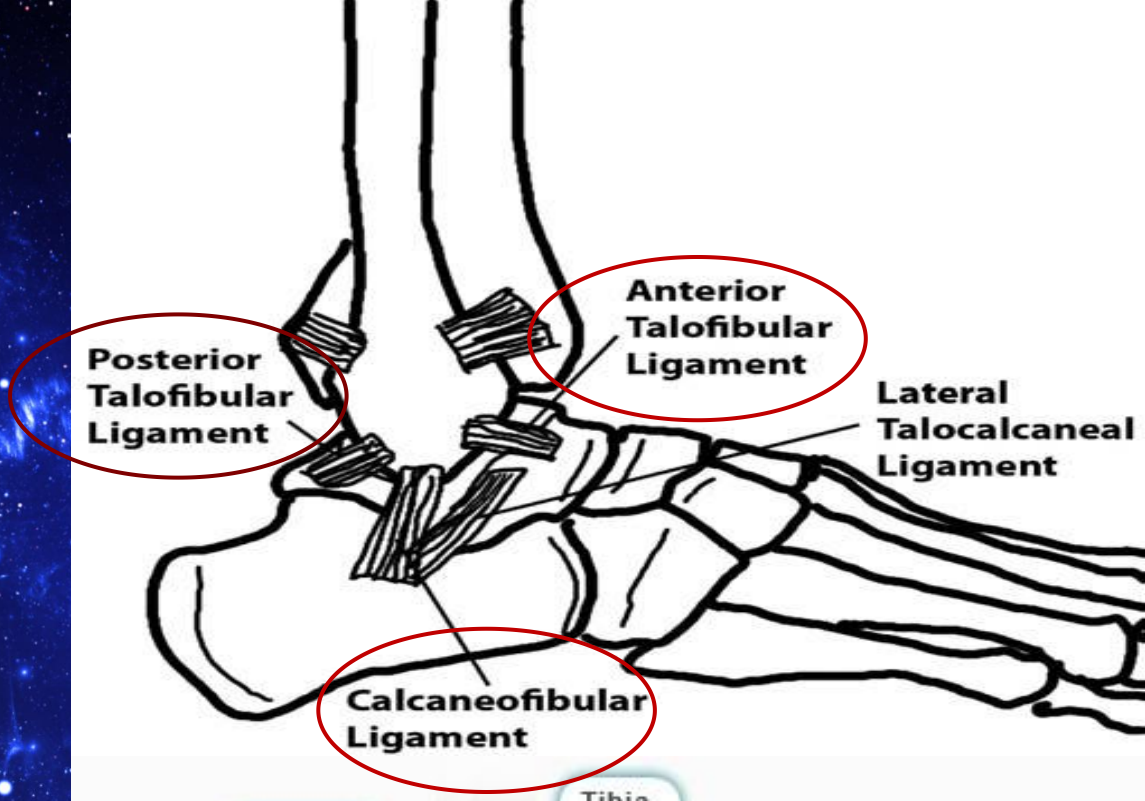
Neuromuscular control

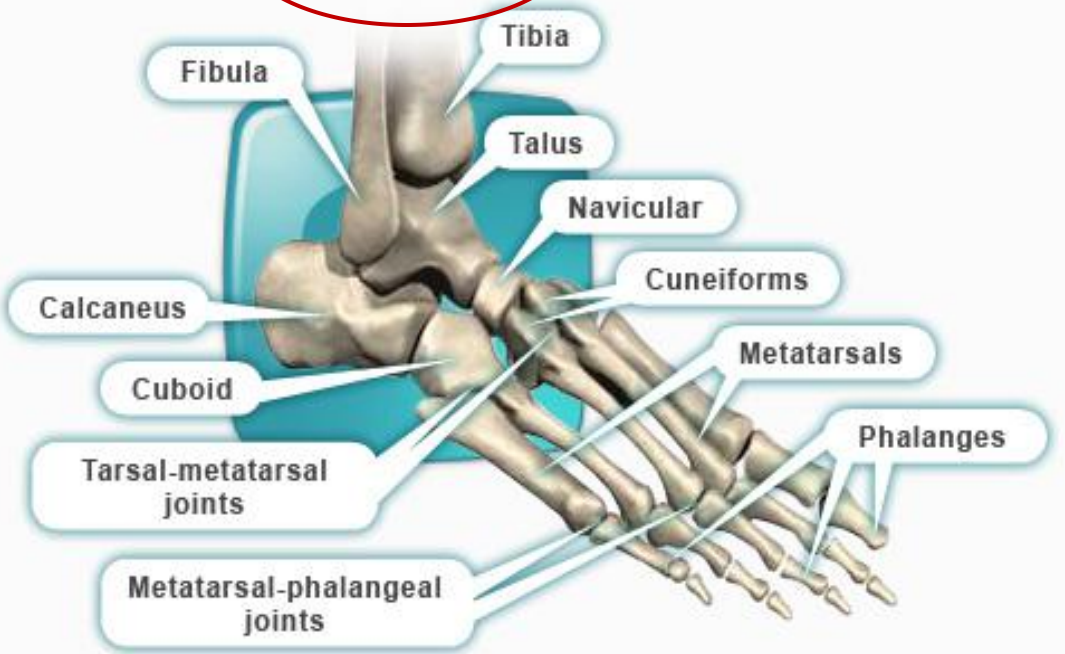
Proprioception

Global stability

Balance

(Keith W. Chan.J.2011)





The reasons of recurrence

Overstretched ligaments

Fibular malposition

Altered neuromuscular control

Peripheral proprioception changes

Excessive exercise load

(You-jou Hung.J.2015)


4
Intervention

Intervention

01·Muscle performance

02·Strecthing

03·Mobilization

04·Balance training

05·Neuromuscular control

06.Orthosis

How to choose?

Evidence-based rehabilitation

GRADES OF RECOMMENDATION BASED ON		STRENGTH OF EVIDENCE
A	Strong evidence	A preponderance of level I and/or level II studies support the recommendation. This must include at least 1 level I study
B	Moderate evidence	A single high-quality randomized controlled trial or a preponderance of level II studies support the recommendation
C	Weak evidence	A single level II study or a preponderance of level III and IV studies, including statements of consensus by content experts, support the recommendation
D	Conflicting evidence	Higher-quality studies conducted on this topic disagree with respect to their conclusions. The recommendation is based on these conflicting studies

(ROBROY L.J.2013.)

1

Neuromuscular control

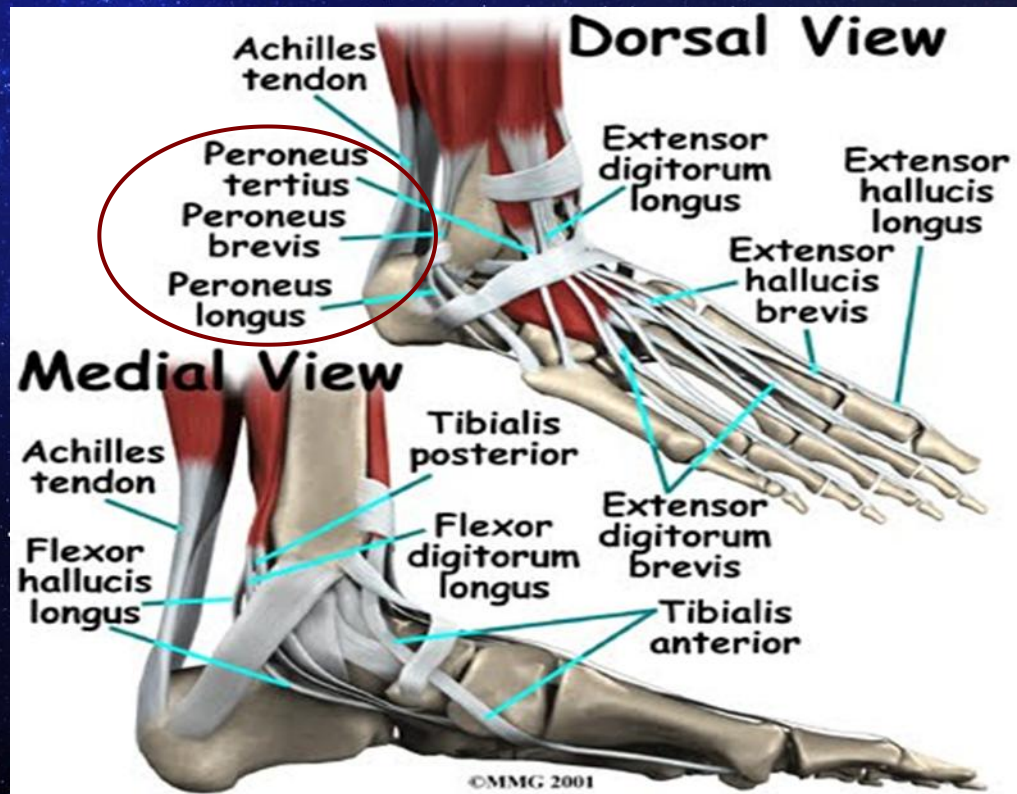
Muscle strength & Proprioceptive training

Grade of recommendation C A

Neuromuscular control of the ankle:

Voluntary muscle contraction : strong but slow

Spinal reflex(peroneal muscles):quick but weak

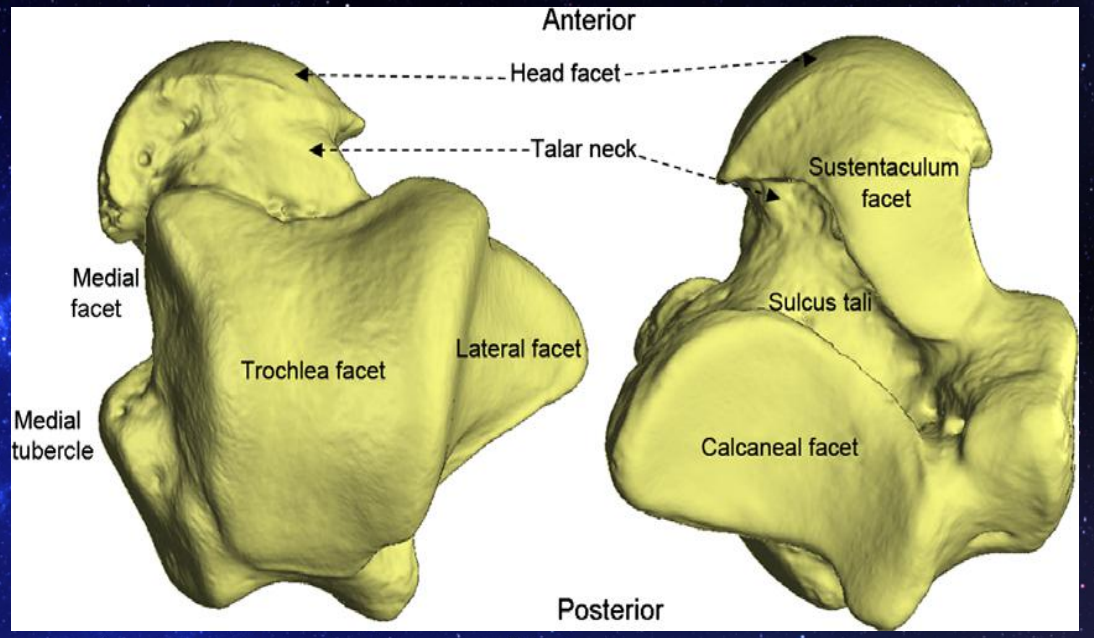



2
MWM

Theoretical Basis

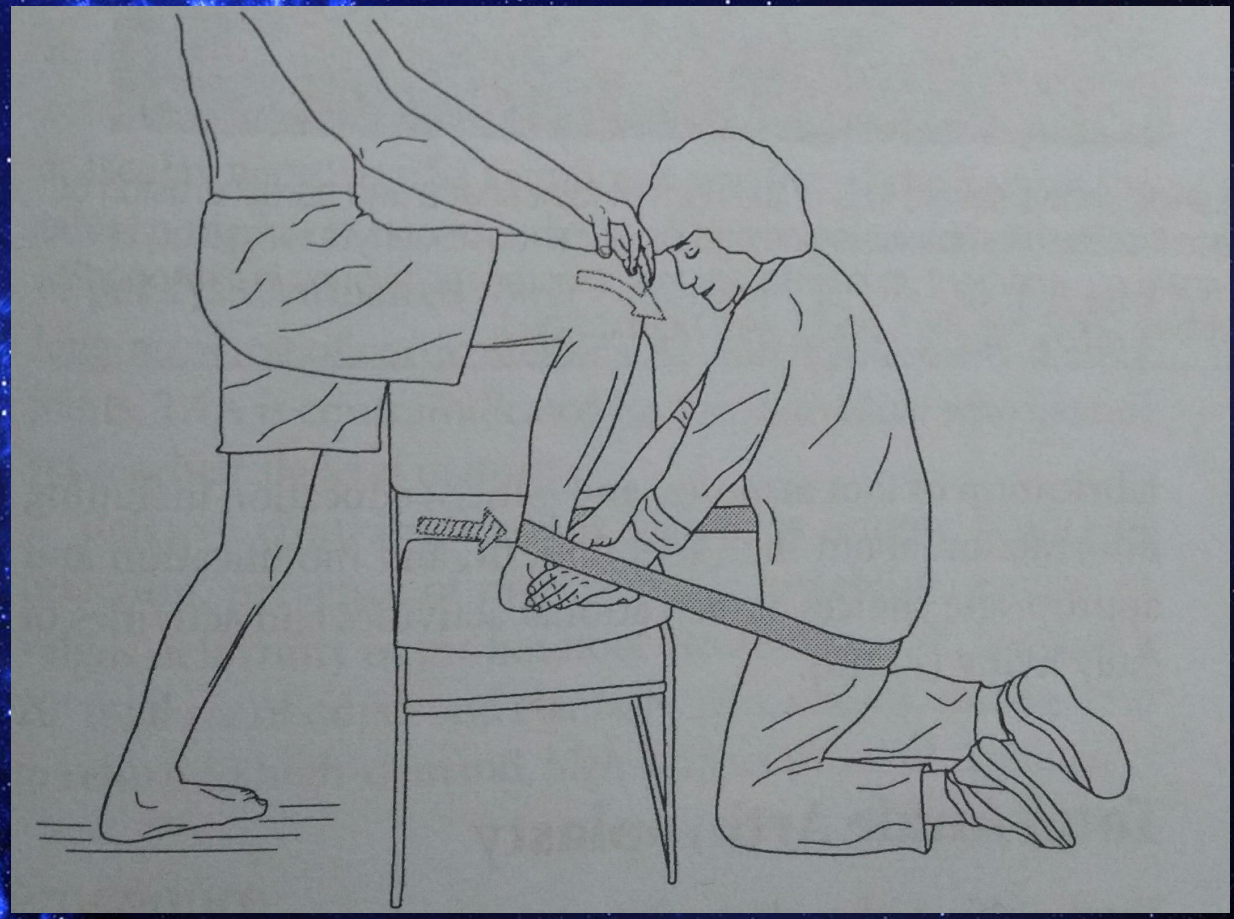
Grade of recommendation A

- Wedge-shaped
- Dorsiflexion is close-packed
- Plantarflexion is loose-packed (instable)



Mobilization with movements(MWM)

- Position
- Elastic Band
- Lunge Forword
- Dorsiflexion



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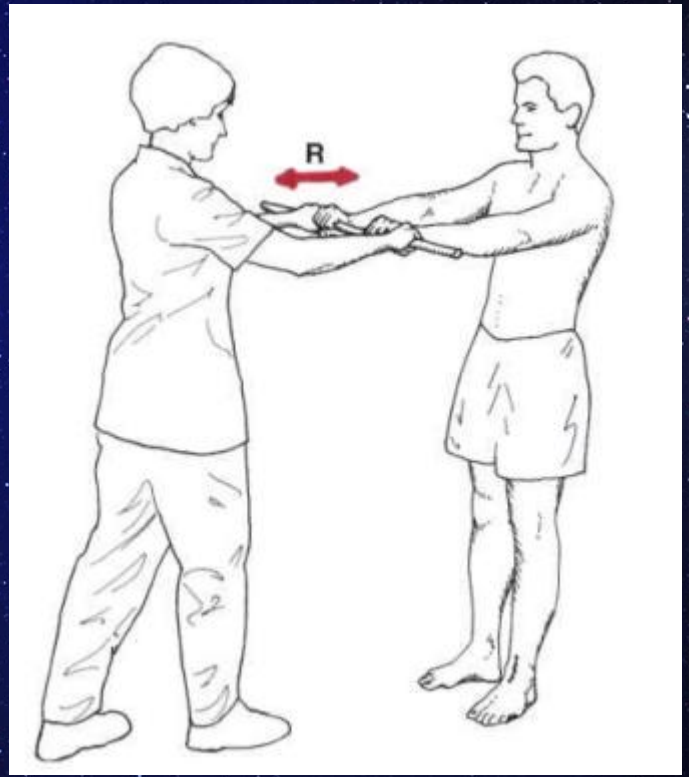
Balance training

Balance training

Grade of recommendation : A

Balance/postural training is the most commonly employed rehabilitation treatment for individuals with ankle instability.

The majority of the literature reports positive therapeutic effects of balance training.



(Holme E, 1999)

Balance training

Grade of recommendation : A

Balance training with a wobble board has also been shown to improve functional performance, improve postural control, and decrease the risk of recurrence in those with CAI.

(Wester.JU & Jespersen.SM,1996)

Balance training

Grade of recommendation : A

Imbalance : faulty lower extremity mechanics

Exercise intervention : weight-bearing , closed-chain

Progressive balance training : stimulate functional activities

Balance training

Grade of recommendation : A

Return to function phase

Functional weight-bearing activities

- Walking
- Jogging
- Jumping
- Hopping
- Running

Agility activities

- Controlled twisting
- Lateral weight shifting
- Shuttle runs
- Tuck jumps
- Hurdle drills

(Webster KA, 2010)

5

New perspectives

New perspectives

- Upper extremity postural control exercises
- Trigger point dry needling
- Fibular repositioning taping technique

(Ryan P McGovern & RobRoy L Martin ,2016)

UE postural control

Deficits in the central sensorimotor integration and processing in individuals with CAI.

Individuals with CAI did not demonstrate a correlation in upper and lower limb postural control.

This may support interventions that address coordination of the upper extremity during ankle rehabilitation as a preventative measure against reinjury.

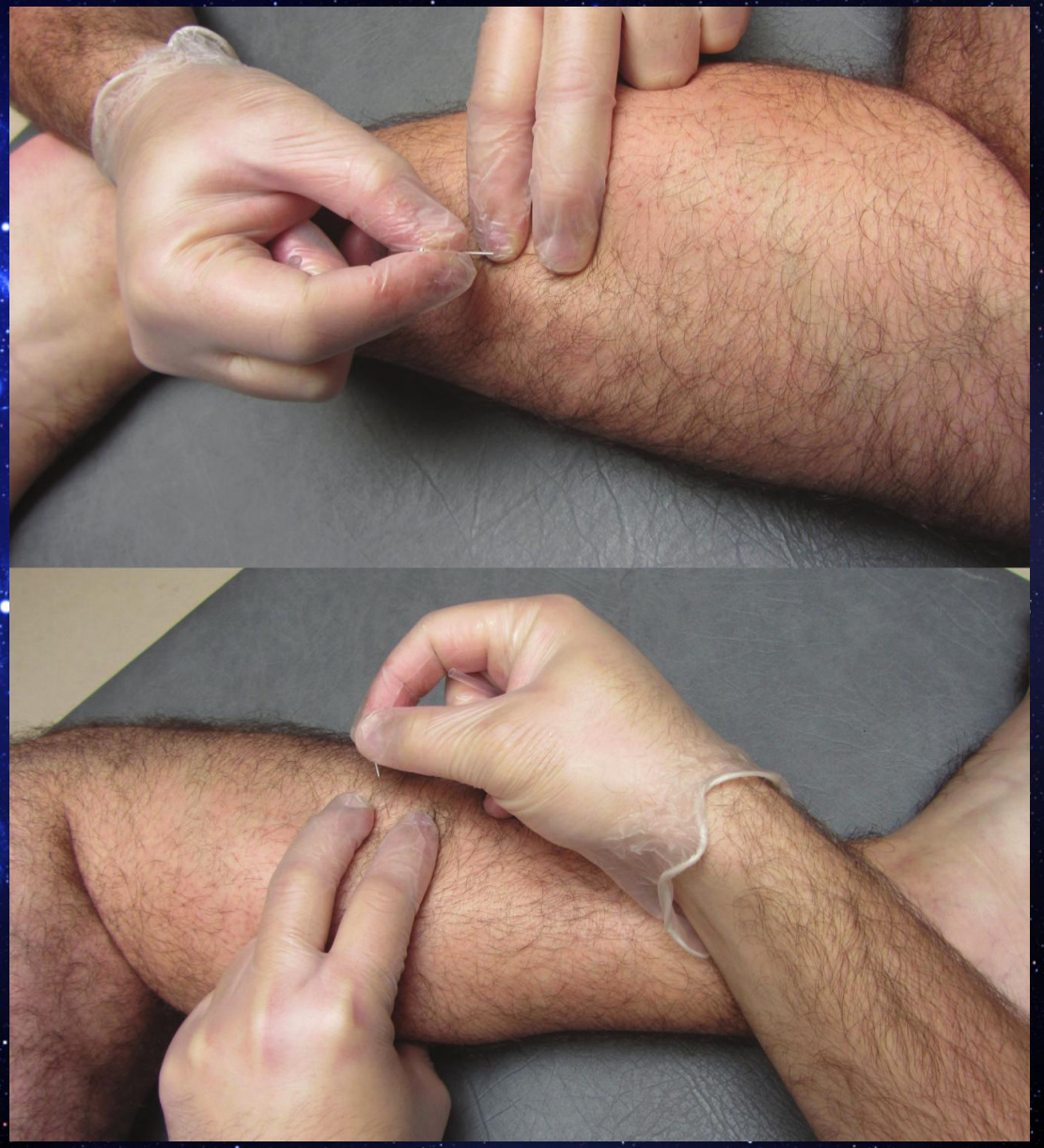
(Springer S,2015)

Dry needling

Activation of trigger points may make ankle **instability**

Dry needling addresses and inhibits trigger points

Trigger points dry needling adds to other interventions to increase effects



(Salom-Moreno J & Ayuso-Casado B ,2015)

Taping technique

Ankle taping initially is to support the unstable ankle in athletic activity.

Two rationales:

fibular repositioning

activation of the skin proprioceptive receptors

(Someeh M & Norasteh AA,2015)

Summary of interventions & preventions

Local stability

1.Altered neuromuscular control — C: Muscle performance

2.Peripheral proprioception changes — C: Proprioception training

3.Overstretched/loosened ligaments — B: Taping

4.Fibular malposition — A: MWM

5.Excessive exercise load — A: Proper functional activities

Global stability

A: Balance training

New perspectives

UE postural control
Dry needling
Taping technique

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Thank you!