



# Surgical Options for Contracture Management

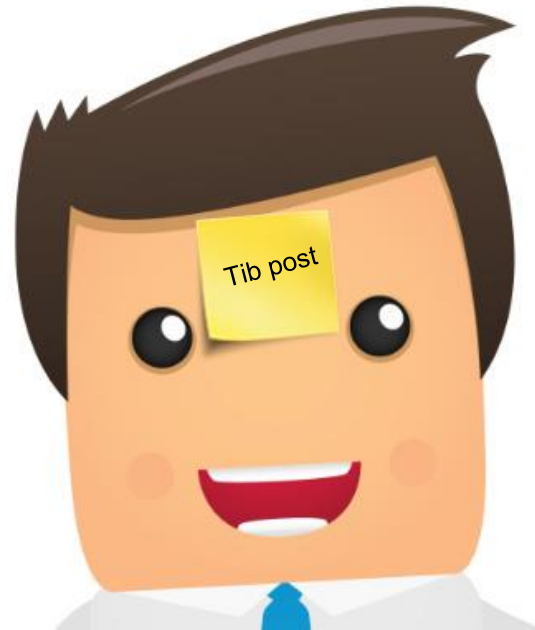
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# How to manage contracture?

- Diagnosis?
- Symptoms?



- Muscle imbalance? What contracture?

# Goal of Treatment

- Improve muscle balance
- Improve symptoms

*NB: Better outcome with a diagnosis*

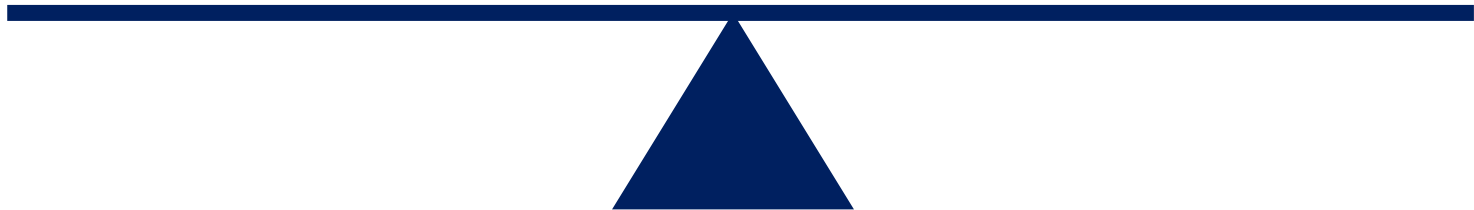
# Muscle Balance

**ANTAGONIST  
MUSCLES**

(oppose the  
action)

**AGONIST  
MUSCLES**

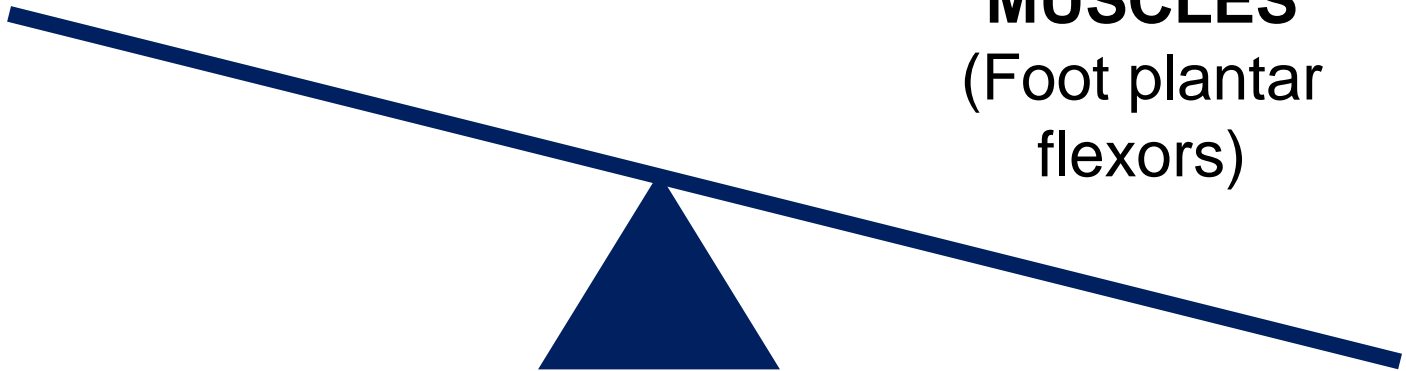
(produce the  
action)



# Example of Muscle Imbalance (Equines)

**ANTAGONIST  
MUSCLES**  
(Foot dorsal  
flexors)

**AGONIST  
MUSCLES**  
(Foot plantar  
flexors)



# Example of Muscle Imbalance

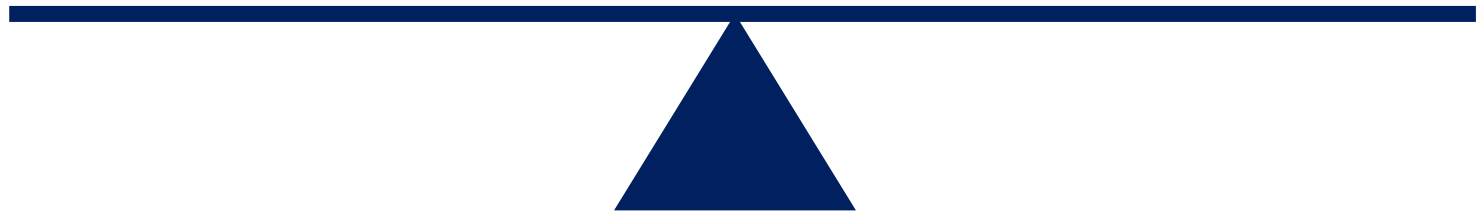
(Treatment for Equines)

## **ANTAGONIST MUSCLES**

Tendon transfer  
*Strengthening*  
*Splint*

## **AGONIST MUSCLES**

Lengthening  
Tendon transfer



# Techniques Available

## Soft Tissue Procedures:

- a) Lengthening
- b) Tendon transfer

## Procedures on Bones:

- a) Arthrolysis
- b) Arthrodesis
- c) Osteotomies
- d) Guided growth
- e) Arthroplasties
- f) Resection of bone (epiphysis)

# 1. Lengthening Techniques

**WHAT TECHNIQUES ??**



# 1. Lengthening Techniques

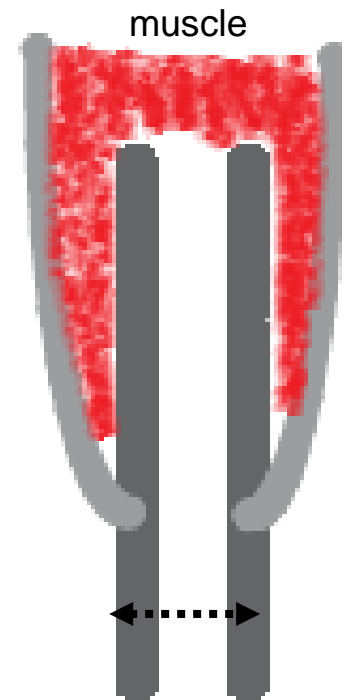
How much lengthening?  
Improve function?  
Antagonist?

# 1. Lengthening Techniques

## I - TENOTOMY

- “*No limits*”
- No more function

*Exception: Ponseti (pc)*

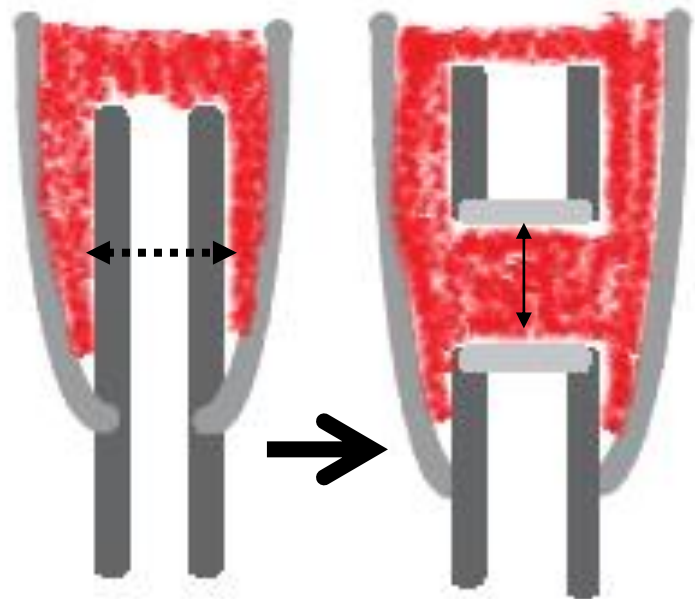


# 1. Lengthening Techniques

## II - TENDON LENGTHENING

(WIR technique)

- 15 to 20mm
- Keep some function
- Early rehabilitation

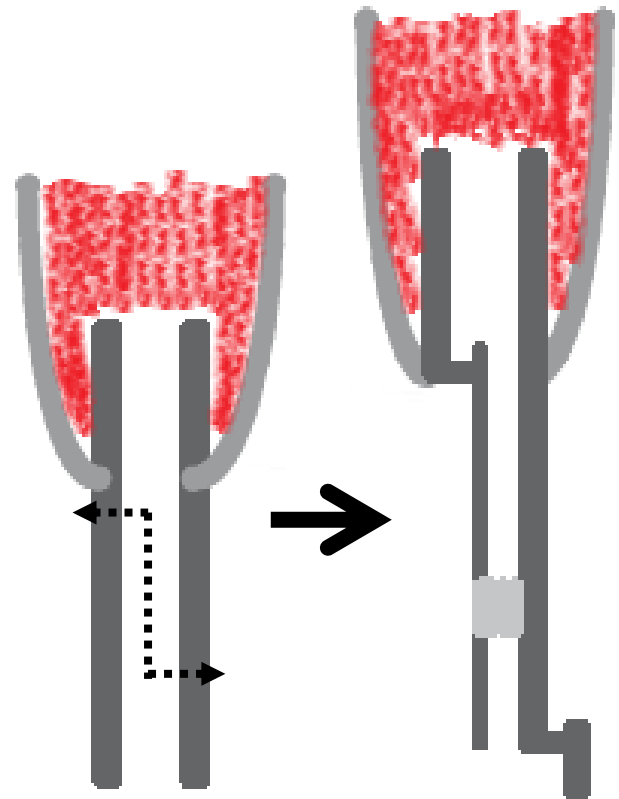


# 1. Lengthening Techniques

## III - TENDON LENGTHENING

(Z technique)

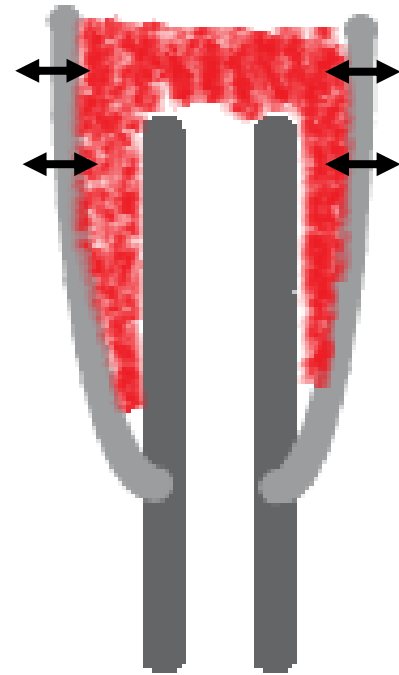
- “*As required...*”
- Open vs. pc



# 1. Lengthening Techniques

## IV - APONEVRECTOMY

- Keep good function
- No immobilisation required



# 2. Tendon Transfers

## I – Active Transfer

- Need 4/5 strong
- Functional muscle contraction

# 2. Tendon Transfers

## II – Passive Transfer: TENODESIS

- Proximal fixation on bone/ligaments
- To stabilise joint



CP

Tendon lengthening  
Tendon transfer  
Osteotomy





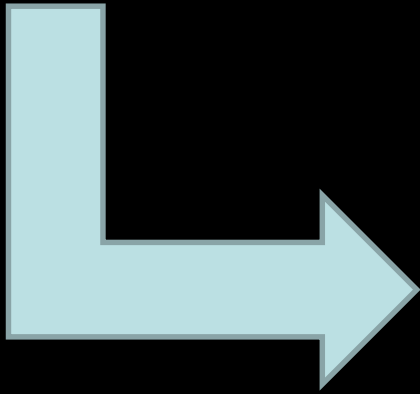
# 3. Procedures on Bones

## I – Arthro-lysis (joint release)

- Keep ligaments
- Useful for SB contractures (joint)
- Less useful for CP contractures (extra-articular)

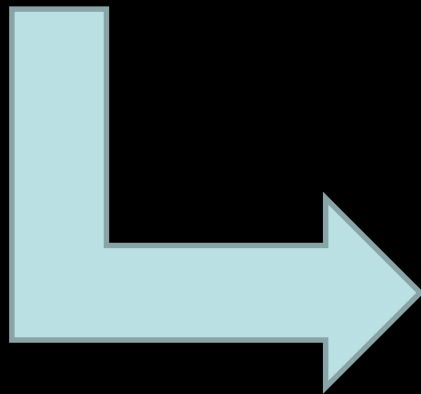


Idiopathic





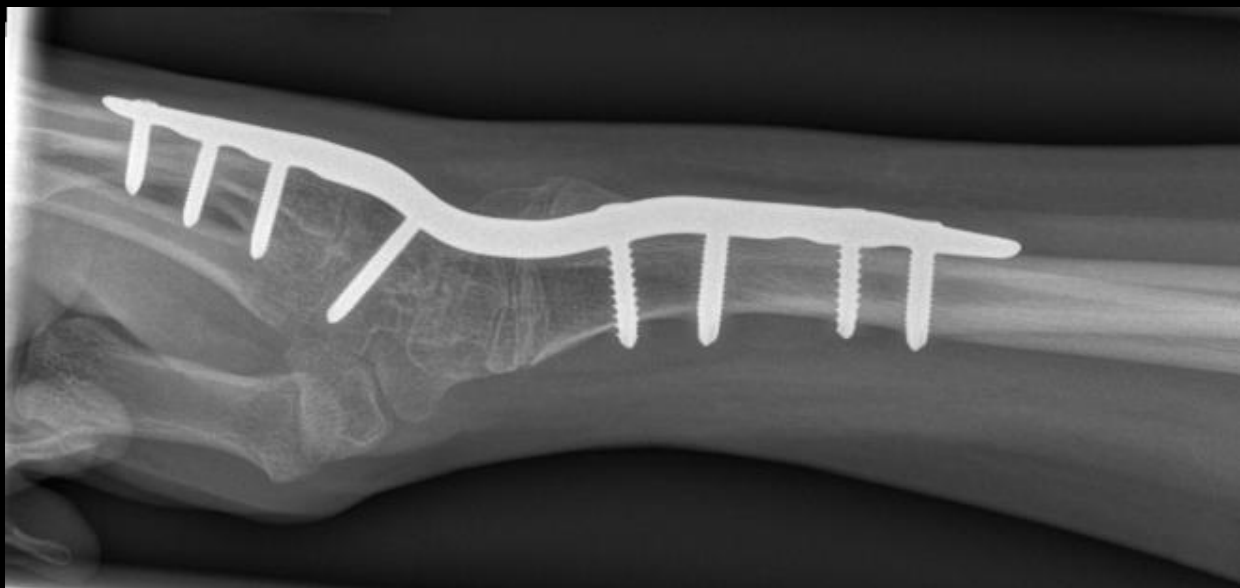
Idiopathic



# 3. Procedures on Bones

## II – Arthro-desis (joint fusion)

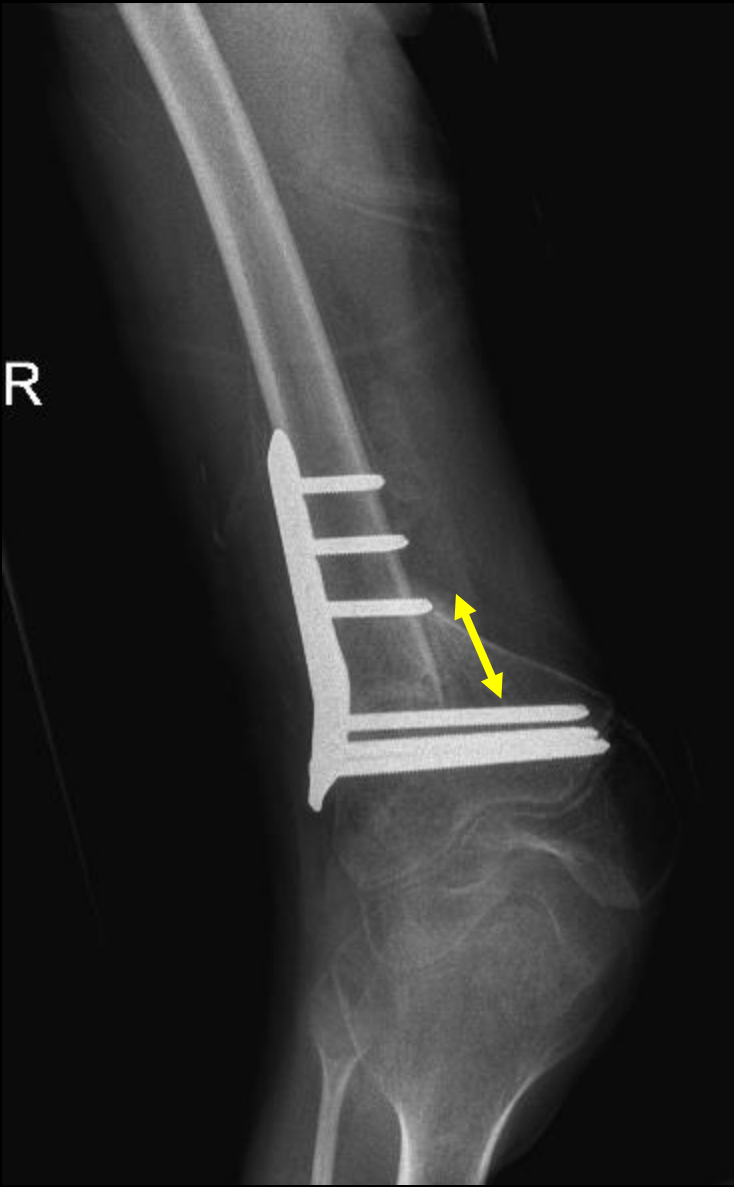
- Distal joints (foot/wrist)
- Can be associated with bone resection



# 3. Procedures on Bones

## III – Osteotomies (bone division)

- Correction of bone deformity
- Shortening effect (indirect lengthening of the soft tissues)

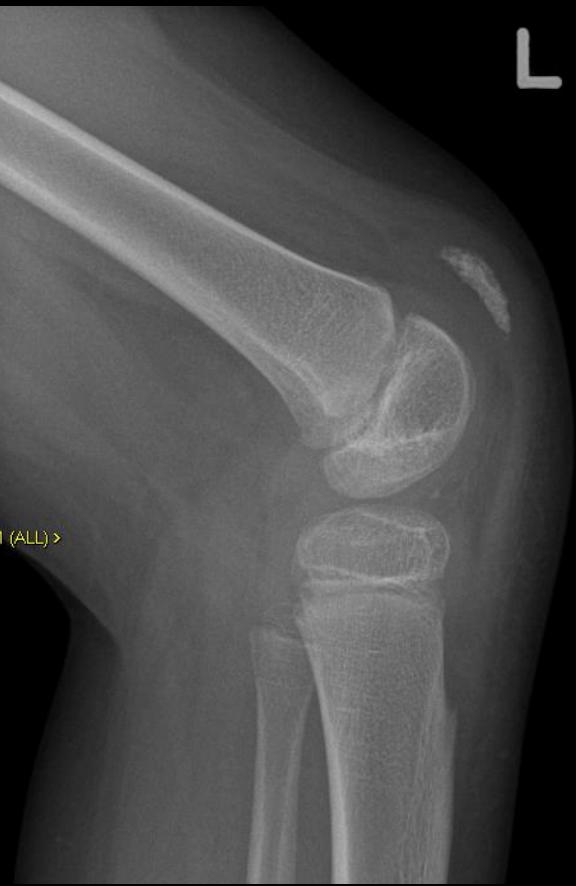


# 3. Procedures on Bones

## IV – Guided Growth (Children)

- Progressive correction of bone deformity
- No shortening effect
- Mild joint contracture





# 3. Procedures on Bones

## V – Arthroplasties (joint replacement)

- For osteoarthritic joint (essentially hip)
- Improve joint ROM
- Adult

# 3. Procedures on Bones

## VI – Epiphysis resection

- Improve ROM
- Salvage procedure

# Risks and Complications

## 1. Skin

- Wound complication by stretching
- Skin necrosis by stretching:
  - Medial malleolus
  - Popliteal fossa
- Pressure sore (heel)

# Risks and Complications

## 2. Neuro-vascular

- Important correction (elbow, knee)
- How to avoid:
  - Progressive correction (nerve)
  - Preventive neurolysis (nerve)
  - Perop assessment (vascular)

# Risks and Complications

## 3. Infection

- Higher risk
- Even higher for bone surgery

# Risks and Complications

## 4. Immobilisation

- Skin problem in cast (pressure sore)
- Dismiss non-WB instruction
- Ex Fix
  - Avoid cast complication
  - Generate other complication/pb

# Treatment Strategy

- EASY – when isolated contracture
- DIFFICULT – when complex deformity(ies)



2 questions to answer:

1. All in one correction?
2. How to prevent future trouble?



# “All in One” as much as possible!!!

- Correct every causes:
  - Muscle contracted
  - Joint stiffness
  - Improve muscle balance
  - Deformities linked (KFFD and HFFD)
- Reduced risk of re-occurrence
- *Small risk of under/over correction*

# Think also for the future...

- Wise choice of surgical approach
- Avoid lengthening that erase totally the muscle function (tenotomy)
- Avoid weaken muscles that can be transfer later

# Conclusion

- Vast choice of surgical techniques
- Adapt technique to patient/diagnosis
- Gait lab
- MDT

**THANK YOU**