

## Rheumatoid foot

이 경 태\*

### PATHOPHYSIOLOGY

- \* synovitis of MPJ
- distended MPJ
- chronic capsular distension
- loss of integrity of collateral ligament & capsule
- wt bearing & ambulation (chronic dorsiflexion force on MPJ)
- subluxation / dislocation of MPJ
  
- \* MPJ dislocate
- FHL migrate from plantar to intermetatarsal space (functional extensor)
- PP base rest on dorsum of MT neck
- progressive contracture of FHL, plantar intrinsic m locks PP base on neck of MT
- plantar fat pad drawn distally over MT head, only thin tissue covering on plantar surface of MT heads
- atrophy of remaining fat pad
- loss of normal protection, further stress on the skin

- thick heavy IPK on MT head ulceration
  
- \* lesser toe clawing
- no longer lateral stability of 1st toe
- hallux migrate medially beneath 2nd & 3rd toe
- articular cartilage destruction by pannus resorption of subchondral bone
- more hallux valgus

### FOREFOOT

### INTRODUCTION

- \* Kennedy A. Johnson 100 % of 10 yrs Hx of RA have clinically apparent involvement of foot
- \* 16 % of RA pt foot problem as a initial manifestation (Thomas)
- \* incidence of initial foot and hand involvement is approximately same (15.7 % vs 14.7 %)  
— but layman, rheumatologist, Orthopedic

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surgeon pay attention to only hand problem

\* MECHANISM OF ACTION

1. synovial hypertrophy and hyperplasia
  - stretching of normal capsular restraint
  - ligamentous laxity , secondary muscle imbalance
  - joint subluxation , dislocation
2. activation of inflammatory cascade
  - enzymatic destruction of cartilage, periarticular tissue, normal supportive structure

- \* plantar fat pad attached to the plantar aspect of the proximal phalanx D/L of MTPJ
- distal migration of fat pad and plantar-directed force on MT head
  - metatarsalgia, callus formation under trans. MT arch, skin breakdown under prominent metatarsal head

- \* hallux valgus deformity result from MTPJ distension and loss of both dynamic and static stabilizer as hallux drift valgus , EHL drift laterally -- act as adduct than extensor -- MT drift into varus position facilitated by laxity and damage at 1st MTPJ

\* Clinical vasculitis 2 forms

- 1) bland obliterating endarteritis involving digital vessels self-limited

nailbed or periungual hemorrhages generally not requiring treatment

- 2) inflammatory focal & segmental vasculitis involve major vessel with infarction ,gangrene even death major delay in wound healing vasculitis of nerve -- secondary nerve involvement (Rheumatoid neuropathy)

PHYSICAL EXAMINATION

- \* begin with evaluation of stance and ambulation capacity in barefoot pt. severe forefoot deformity -- efficient to-off block -- antalgic, flatfooted, steppage gait

\* **prime factor for clinical deformity pathological attenuation of the soft tissue support of the MTPJ**

- earliest sign
  - 1) soft tissue swelling
  - 2) spreading of toe
  - 3) initial involvement of lateral MTPJ
- chronic synovitis
  - 1) splaying of the forefoot
  - 2) ligamentous & capsular laxity
  - 3) joint subluxation, dislocation

- \* hallux valgus -- primary deformity in great toe large, painful, medial soft component of bunion -- rare different size of medial soft tissue prominence attribute to avoidance of tight shoe, decreased ambulation, different disease

process

cf) rheumatoid big toe " hallux tortus"  
comprehensive foot course pronation  
exceed 20 degree painful callus  
on medial IPJ where WB IPJ  
hyperextended 40% Nail dystrophy  
on the top Nodule or cyst formation  
under crease of IPJ

\* skin problems

- 1) skin over forefoot -- often thin and fragile secondary to inactivity and cortisone use
- 2) rheumatoid nodule due to vasculitis of subdermal connective tissue
- 3) callosity , ulceration and infection pressure effect upon atrophied skin from rheumatoid nodule altered mechanism of dislocated MTPJ

## RADIOLOGIC EVALUATION

check under weight bearing position (AP, lateral, oblique)

### 1. earliest sign

- \* soft tissue swelling
- \* periarticular osteoporosis 2ndary to hyperemia of synovial hypertrophy

**5th MTPJ -- rapidly & symmetrically other 4 toes - inflammed synovium at first intracapsular but non-articular recess in joint - this unprotected bone destructed by**

**inflammatory pannus -- marginal erosion - both medial & lateral aspect of 5th metatarsal head -- early osseous changes only medial aspect of metatarsal of other four -- osseous change distal medial aspect of PP of 1st toe -- early in disease process - as progree, plantar aspect of MT head eroded**

### 2. late sign

- \* joint space narrowing secondary to cartilage destruction
- \* generalized osteoporosis -- systemic inhibition of osteogenesis
- \* osteophyte ,subchondral sclerosis , intraart bone ankylosis -- 2 OA
- \* positional abnormality 2ndary to lig laxity and MTPJ destruction fibular deviation and subluxation of five MTPJ

(DR LEE EXPLANATION tibial side erosion 증가되면서 MCL가 unstable -- ambulation시 metatarsal oblique break, ER tendency때문에 -- fibula deviation)

complete D/L of PP , AP X-R " gun-barrel " sign of PP

## TREATMENT

- aim
- 1) relief of pain
  - 2) correction or accomodation of deformity

primary care --- optimal control of disease process by rheumatologist

## CONSERVATIVE TREATMENT

\* goals of conservative treatment pain relief, delay progression of disease, accomodate deformity

1. rest -- essential in acute exacerbation

### 2. orthotics

\* decrease positional deformity, provide relative immob of painful area

\* mechanism of action (Gould)

1) cushioned insole reduce shear forces on tender plantar surface supplement the atrophied skin of rheumatoid forefoot rh. nodule or an area of skin compromise -- cut out or relief to insert simple longitudinal (arch) arch support -- provide support and decrease motion of collapsing arch

2) Metatarsal bar and pad etc shift the load proximally away from painful or compromised metatarsal area

### 3. Shoe modification

\* low heeled shoe with soft leather upper of forefoot width decrease forefoot pressure initial recommendation for mild rheumatoid involvement

\* extra depth shoes, soft leather uppers,

open toed shoe and sandal after claw toe, hammertoe deformity develop

\* modified last shoe splaying of forefoot

### 4. Foot care & inspection

\* all pt should after Diagnose

\* proper nail cutting , foot inspection

\* softening lotion decreased hardness of hyperkeratotic lesion

\*\* if early forefoot symptoms

1) splaying of forefoot --- modified last shoe

2) require

- shoe insert -- decrease frictional shear force can be accomplished with simple neoprene liner

- extradepth shoe modification early hammer toe -- MT bar & MLA support metatarsalgia -- full length shank (decrease toe off, tendency to D/L) difficulty in heel slippage -- pillow collar

- externa lshoe modification metatarsal bar, rocker bottom sole -- sever metatarsalgia

- severe deformity custom-made shoe

### 5. Other measure

rest during exacerbation

stretching for ROM

exercise -- gripping exercise , heel rock, inv/ev exercise for strength exercise sandal -- also useful

short term cast  
wt control , cane & crutch  
intraarticular injection of steroid  
(By Cracchiolo 1984 ICL) in forefoot ,  
aspiration of MTPJ < bursae aspiration,  
injection no more than one injection  
per month in 3 consecutive months for  
9 to 12 mo (3달 연속 ,1달에 1번씩 다음에  
는 9, 12개월후) can delay surgical  
treatment

## SURGICAL TREATMENT

### GREAT TOE

1st MTPJ Fusion

### LESSER TOE

2,3,4,5th Metatarsal head resection  
arthroplasty