Symposium: Navigation & pedography in foot & ankle surgery

PEDOBAROGRAPHY

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Introduction

Pedobarography

Exam of the posture or the gait not only of the function of the foot and ankle

Always in association with complete clinical examination with gait analysis because of various normal results
The function of the toes is well analysed in dynamic pedobarography.
The function of the toes depend of the function of the ankle and the hindfoot.
What’s the good procedure in dynamic analysis?

- Always the same procedure: pre & post op
- Same platform
- Same conditions:
  - second steps / several steps
  - only visual good steps
  - at least two trials before recording
  - at least 3 records / foot and always both feet
Sequential pedobarography (JY Cornut)

Specific movement on platform to evaluate neurologic or functional diseases

2 examples of double heel rise test

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Dynamic pedobarography: only stance phase

- Heel strike (0 to 15%)
- Sole phase (15 to 40%)
- Heel rise (40 to 50%)
- Push-off (50 to 60%)
How to analyse the results?

The video: 1 step = 1 sec

We need parameters during the time
How to analyse the results?

Print & curves

Maximal pressure

Force

Area

Time

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How to analyse the results?

Center of pressure (gait line) and lateromedial force index

Pronosupination during the step

supination

valgus

pronation

time

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How to analyse the results?

1. **FORCE TOTALE**
   - Force time integral (Libotte)

2. **Evolution de la force.**
   - Relative impulse = mask FTI/ total FTI

3. **Pedobarography – EFAS – Geneva 2 september 2010**

4. **Legend:**
   - Masks: 10 masks
   - Force time integral (FTI)
How to analyse the results?

Comparison of force time integral in metatarsal and toe areas in HV surgery (from B Ferré)

preop                                     postop

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Indications: to understand the disease

Flatfoot varus in Muller Weiss disease

Posterior view: hindfoot well axed
But specific dynamic pedobarography
Indications: to understand medical treatment

Strapping in 2nd ray syndrom
Indications: evaluation of the surgery

Comparison of pre/postop print:

HV surgery: scarf osteotomy

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Indications: evaluation of the surgery

Ankle instability without laxity in 16 YO woman...
...because gastrocnemius retraction

Dynamic hindfoot varus = MTP5 overpressure
= LMFI: lateral force

After, medial gastrocnemius release and win of 30° ankle dorsal flexion

Valgus of the hindfoot 6 months post op
Indications: evolution of the surgical result

Equinus varus cavus foot (lodge syndrom)

Result after conservative surgical treatment
Dynamic Pedobarography evolution on 7 years

preoperative   12 months   3 years   7 years
Lateromedial force index (LMFI)

1 year

7 years

In spite of print evolution, no LMFI evolution
Woman 65 YO
Flatfoot with
PTT rupture
Treatment:
Evans & scarf
without PTT surgery
preop

8 months: No toes ground contact 2nd metatarsal stress fracture at 1 year

2 years

4 years: Stop insole

6 years
Is a bad result well analysed?

Before surgery

Compression of graft = little correction
LMFI = no change

After surgery

But, sometimes normal LMFI curve but bad result
= good shape and function in spite of painful foot (non healing, ...
Indications: evaluation of the surgery

Ankle prosthesis

Preop  6 months  2 years
Indications: comparison of procedure

Evans + lowering M1

Medial translation + FDL transfert
Conclusion

Dynamic Pedobarography is an objective exam of the function of the foot and ankle but also of the lower limb.

The interests for the surgeon of the foot and ankle:
- To understand the function
- To evaluate a medical treatment / insole, strapping, physiotherapy before or after surgery
- To evaluate the surgical result in short or long follow-up
- To compare different surgical procedures

Thank you for your attention.